BRUHAT BENGALURU MAHANAGARA PALIKE

"NAME OF WORK : Improvements to Roads and drains in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli. Estimate Cost: 100.00 Lakhs."

OCTOBER 2021

SHRIYA CONSTRUCTION AND CONSULTANCY

No. 1133, 3rd Floor, 3rd Stage B Cross, above BATA Showroom,
Yelahanka New Town, Bangalore – 560064.
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DESIGN REPORT

Submitted To:

Office of Executive Engineer,
Byatarayanapura Division
Bangalore 5600692
BBMP

October 2021

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1 Introduction

Project Background

Bruhat Bengaluru Mahanagara Palike (BBMP) is one of the premier organizations in the state of Karnataka. The Bruhat Bengaluru Mahanagara Palike is the administrative body responsible for the civic and infrastructural assets of the city of Bengaluru, India. BBMP is involved in providing assistance and support for better planning and implementation of urban infrastructure in Bengaluru.

Bangalore is growing at a rate, which is significantly higher than that of others. Due to the Growth in Economic Activities, the City is attracting migrants. To serve this Influx of Population, Residential Layouts are being developed. But adequate Transport Infrastructure Facilities such as Roads, Grade Separators, Subways, Mass Transit System, etc. to match this demand are conspicuously absent. The additional demand is to be catered by the already Saturated Road Network. Due to the Inherent Road Network in Bangalore, there are on the average 2 Major and 2 Minor Junctions per kilometre of Road Length. This has resulted in increase in Travel Time due to frequent Bottlenecks and Breakdowns.

The Urban Form of Bangalore is characterized by a Radio -Concentric System structured by Ring Roads, Five Major Radial Roads and Five Secondary Radial Roads. The Five Major Radial Roads are Mysore Road (SH 17) in the South / South West, Old Madras Road (NH 4) in the North / North East, Bellary Road in the North (NH 44), Hosur Road (NH 7) in the South .East and Tumkur Road in the North West. Similarly, the Five Secondary Radial Roads include Magadi Road (SH 17E) in the West, Kanakapura Road (NH 209) in the South, Bannerghatta Road (SH -87) in the South, Varthur Road and Whitefield Road (SH 35) in the East. The differentiated development of the City based on Geographical Sectors

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and the Star like Growth Array along the Major Roads, mark the change from a Concentric Spatial Growth to a sectorial and Linear Radial Development.

The Estimated Population of BBMP's 104,103,106,125,128 Wards as per the 2011 Census is 95.56 Lakh, up from 45.92 Lakh in 2001 and 24.75 Lakh in 1981. The extent of Developed Area has also increased considerably, in 1971 the Area was 1174.7 Sq. km. and today it is about 800 Sq. km. In absence of Adequate Mass Transportation System, the use of personal motor vehicles for intra city travel has increased substantially. This has resulted in growth of motor vehicles, which is eight times the rate of population growth in the last two decades (1.91 Lakh vehicles in 1981 and 38.86 Lakh vehicles in 2011). The Public Transport System (Bus) is overstressed carrying about 50 Lakh Commuters on a daily basis. Congested Streets and Longer Route Length due to Urban Sprawl have only served to reduce Bus Frequencies further.

It's one of the zones of BBMP. It is located 15 km from Bangalore City railway station. ***Kempegowda Airport Road*** *passes through this ward.* ***Byatarayanapura*** *is one of the constituency No198 in Bangalore and as such, houses many government offices. It is also a Karnataka Legislative Assembly/ State assembly constituency. It is a part of the Bangalore south Lok-Sabha constituency.*

The combined effect of all these on the Road Network of Bangalore is Delay and Congestion beyond Tolerable Limits. Vehicular Conflicts at the Intersections are being eliminated by Traffic Signals but at the Expense of Delays and Long Queues. The Peak Hour has spread over a longer period of time, since there are no Perceptible Capacity Augmentation / Conflic1 Reduction Measures. Traffic related Problems have become Regular Phenomena on Bangalore Roads, due to the Vast Developments. This fact is substantiated by the Traffic Study Results, at various Road Networks and Intersections of the City. Most of the Major Junctions of the Core City have crossed the mark of 10000 PCUs in the Peak Hour. Though number of Grade Separators have been constructed and are being

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constructed, most of them are located in the Developed Part of the City and causing a Trigger Of Congestion at adjacent Junctions. Traffic Management Measures such as One Way Systems, Parking Restrictions, Junctions Improvements, etc. are being implemented to ease the Congested Street Network. But the ever increasing Traffic is fast deteriorating the Limited Improvement in Level of Service these Traffic Management Measures can offer.

Bangalore

As a Comprehensive Development Programme for Improvement of Road Network, the Bruhat Bangalore Mahanagara Palike (BBMP) has planned Grade Separated Junction, Widening of Roads, Strengthening of Pavement Base and Sub -Base, Improvement to Pedestrian Facilities, Provision for Car Parking, etc. BBMP has constituted a separate cell to coordinate the Widening of Major Roads in Bangalore City in the face of Land Acquisition Challenges. This Response is the Answer to the severe strain on the Urban Infrastructure, which is inevitable due to the very rapid rate of growth in traffic. Travel Demands of Passengers have increased many folds in the last two decades. Unfortunately, Growth in the Infrastructure is not commensurate with the growing demands of traffic. There is an exigent need to effectively manage the Traffic and Transportation Systems to optimize the Solutions with Short Term and Long Term Measures.

One of the Practical Steps towards Optimal Solutions that will also give an Immediate Relief to Traffic Scenario is Capacity Augmentation. Capacity Augmentation is not possible without widening the High Density Corridors. Increasing the Capacity of important corridors is inescapable in the long run even if it entails Land Acquisition at high cost. The Land Acquisition is proposed through a Process of Conferring Development Rights (Transfer of Development Rights), by which the owner of the land who has surrendered the part of the land towards infrastructure projects would be allowed to carry out construction based on enhanced Floor Space Index (FSI) conferred by the TDRs.

The existing Road Network System of Bangalore is a major concern, both in terms of Conditions of Roads and the Structure of the Network. The Basic

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Structure is Radio Concentric with about Ten Major Roads converging on the Centre. The Roads themselves are crowded and their Convergence creates Heavy Congestion. In order to ease the Traffic related Problems, the Bangalore Development Authority (BDA) constructed the Outer Ring Road (ORR) connecting all Major Roads and Highways in and around Bangalore. The newly Developed Areas on the outer side of the Ring Road have caused much increase in Traffic across the Ring Road, which in turn is obstructing Flow of Traffic along the Ring Road and the ORR is currently heading towards a Saturated State of Flow, leading to Planning of New Road Infrastructure Development.

M/S Shriya Construction and Consultancy, Bengaluru have been requested to submit a Detailed Project Report for the selected roads. The Client for the present assignment is ***Bruhat Bengaluru Mahanagara Palike*** *represented by the* ***Executive Engineer****, Byatarayanapura Division, BBMP, Bengaluru 560092.*

Project Objective:

The main objectives of the project are as under:

- *To conduct necessary surveys, studies, investigations and designs required to prepare Detailed Project Report as per the norms of IRC and latest building code.*
- *To prepare BOQ, Cost Estimates and specifications based on the detailed designs of roads and buildings.*
- *To prepare tender documents and implementation plan*

Client:

The Client for the present assignment is ***Bruhat Bengaluru Mahanagara Palike****, represented by the* ***Executive Engineer****, Byatarayanapura Division, BBMP, Bengaluru 560092.*

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Consultant:

M/S Shriya Construction and Consultancy with its registered office in Bengaluru has been entrusted the work of preparation of Detailed Project Report, Cost Estimates, Tender documents and Implementation plan for the project roads.

Document organisation

The document is organized as follows:

1 – Introduction

2 – Scope of Work

3 – Project Appreciation

4 – Approach and Methodology

5 – Design Standards & Code of Practice

6 – Engineering Surveys & Investigation

7 – Design Proposal

8 –Cost Estimate

9 – Conclusion.

2 Scope of Work

The Scope of the Study to be carried out by the Consultant involves the following.

- *Review of Available Data and Reports.*
- *Topographical Survey of the Corridor.*
- *Road Inventory and Visual Condition Survey.*
- *Pavement Condition Survey.*
- *Test Pit Investigation Survey.*
- *Benkelman Beam Deflection Survey.*
- *Basic Engineering Designs along with Detailed Estimate for the Approved Concept of Roads.*
- *Preparation of Tender documents.*

Furthermore, if any field activities are to be carried out during the survey it will be taken into consideration purely on need basis

Deliverables

Following deliverables are planned:

Documents

- *Draft Detailed Project Report.*
- *Final Detailed Project Report*

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Drawings

- *Location Plans (Google Location)*
- *Strip Plans*
- *Typical Cross Section of Road*
- *Miscellaneous Drawings*

All deliverables will be submitted in hard (two) sets and soft copy. All soft copy will be in PDF format.

Drawings will be submitted in Suitable scale, in A4 or A3 size accordingly.

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3 Project Appreciation

General

As a part of project appreciation, the Consultant's engineers had a discussion with the Client's representative at the office of ***the Executive Engineer, Byatarayanapura Division, BBMP, Bengaluru 560092.*** *The meeting was followed by a preliminary reconnaissance survey of the project site, to access the actual ground conditions. The findings and observations are enumerated in this chapter.*

Demography

Bengaluru demography features that over 12 million people live in the city. Bengaluruis the third densely populated city of India. According to the data of 2017, the population of Bengaluru is estimated to be around 12,300,000.Bengaluru demography also features that the growth rate of population is 4.1% per year. The density of population in Bengaluru is 17,000 per square kilometer.

Geography

Bengaluru lies in the southeast of Karnataka. It is in the heart of the Mysore Plateau (a region of the larger Precambrian Deccan Plateau) at an average elevation of 1010 m (3,448 ft) from the MSL. It is positioned at 12.97°N 77.56°Eand covers an area of 1741 km² (896 mi²).

Climate

Bengaluru always experiences a very soothing weather with warm summers and cold winters. But neither the summers are very hot, nor the winters are very cold. The maximum temperature level at the summer time can rise to 36°C

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whereas those during winter can even go below 17°C. The weather becomes foggy in the early mornings of October to February which is the maximum in the months of December and January. The climatic condition in Bengaluru is very much influenced by the low cloud during the months of June to September. The weather in Bengaluru is neither too humid nor too dry.

Rainfall

The average annual rainfall in Bengaluru City is 859 mm.

Topography

The general terrain along the project road is predominantly plain.

Land Use Pattern

Major section of the project roads traverses through residential and commercial establishments.

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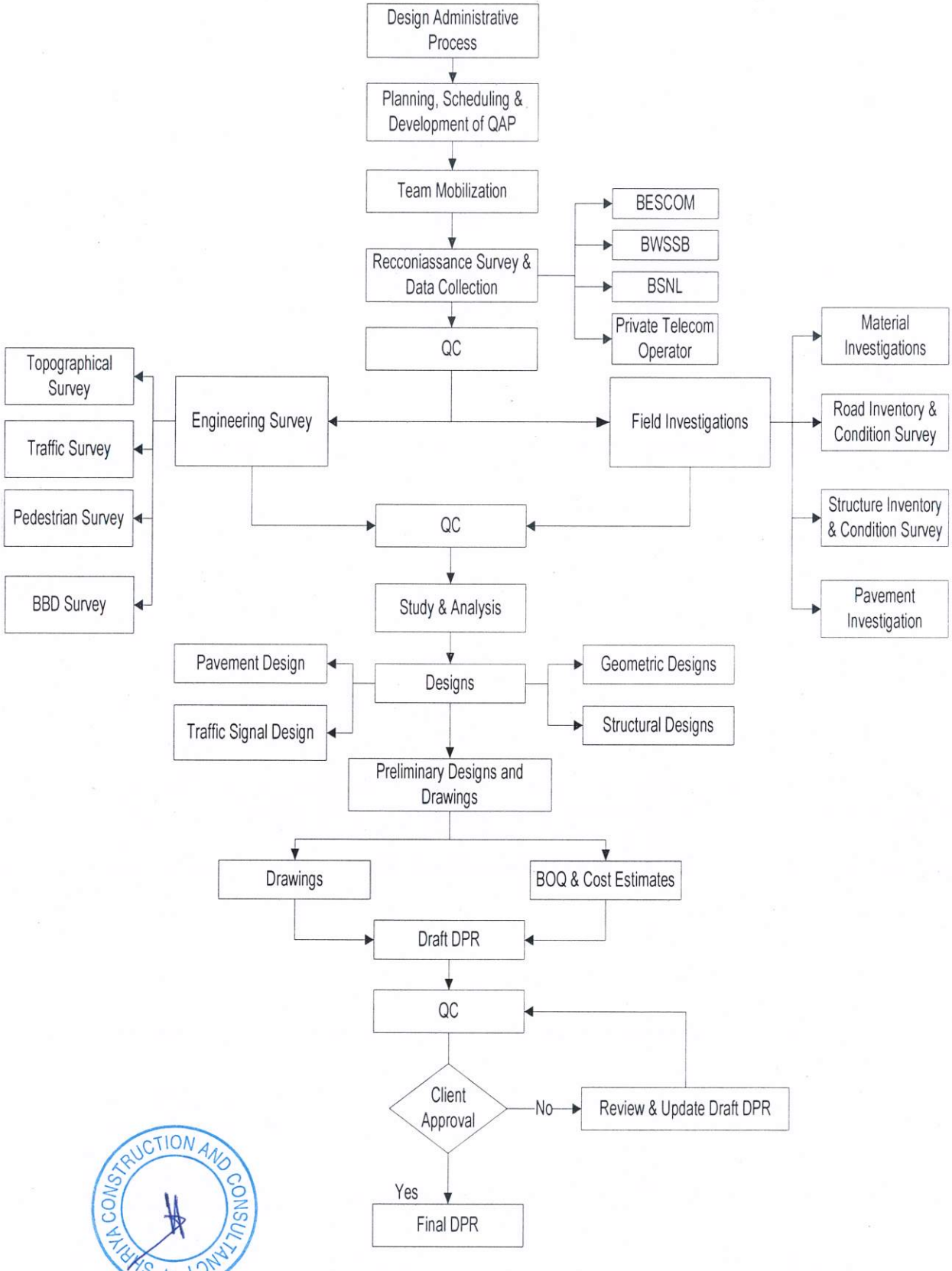
4 Approach and Methodology

Design Approach

The design approach followed by Consultant is illustrated in ***Figure 4.1.***



Methodology

Designing & Developing a Geo Database involves the following tasks:

- *Reconnaissance Survey*
- *Engineering Survey*
- *Inventory and Field Investigation*
- *Existing RoW mapping – Cross section detailing and strip plan with entry exit mapping*
- *Pavement Design*
- *Geometric Design*
- *Road side storm water drains design*
- *Detailed design of junctions with plan, level, drainage, islands, marking, etc.,*
- *Cost Estimation and Bill of Quantities*
- *Power point presentation, meetings and discussions on the project at various levels*
- *Preparation of technical specifications and tender documents*

The methodologies adopted by the consultant for the various tasks mentioned above are detailed in the following sections.

Reconnaissance

The Reconnaissance of the project road has been undertaken to assess the following:

- *Condition of the existing road*

- *Condition of existing structures if any.*
- *Conditions of existing pavement by conducting Pavement investigations at selected locations*
- *Existing RoW*
- *Provision for Pedestrian.*
- *Inventory of the existing utilities.*
- *Inventory and condition of existing CD structures if any.*
- *Inventory of existing signage*
- *Inventory of existing drainage system*
- *In case of building, use and age of building and feasible of additional construction*

The primary tasks to be accomplished during the reconnaissance surveys include:

- *Topographical features of the area*
- *Typical features along the existing alignment within RoW*
- *Traffic pattern and preliminary identification of traffic homogeneous links*
- *Sections through congested areas*
- *Critical areas requiring detailed investigations and requirements for carrying out supplementary investigations*
- *Type and extent of existing utility services along the alignment (within Row)*
- *Study of Existing Buildings*

Engineering Survey

Topographic Survey

Detailed Topographical Survey has been carried out on the project roads. The survey was based on horizontal and vertical controls established using high precision Total station. It is also proposed to utilize high end precision survey equipment to gather all the existing features along the project roads.

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This was in addition to all the roads and topographical features such as existing carriage way, utilities, Right of Way, Trees, Structures and other ground features which are being surveyed covering the entire built up section. In addition, all the Cross Drainage structures if any will also be surveyed and shown. The detailed topographic survey has been taken up after the completion of reconnaissance survey.

The detailed field survey will essentially include the following:

- *Topographic survey along the existing RoW: A continuous open traverse has been run along the existing road, wherever required. All cardinal points such as horizontal intersection points (HIP), centre points, transit points etc. has been fixed and the same was referenced with a pair of reference pillars fixed on either side of the centre-line at safe places within the RoW.*
- *Details of all features such as structures (bridges, culverts, etc.), utilities, existing roads, electric and telephone installations (both O/H as well as underground), buildings, fencing and trees (with girth greater than 0.3 m) oil and gas lines etc. falling within the RoW or building to building has been collected.*

The topographical survey for longitudinal and cross sections were covering the following:

- *Longitudinal section levels along final center-line at every 30 m interval, at the locations of curve points, intersections and at the locations of change in elevation.*
- *Longitudinal section for cross roads for length adequate for design and quantity estimation purposes. (Minimum 50 m).*

Details of all important physical features along the alignment have been collected during the topographic survey. These features was include buildings

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and structures, monuments, burial grounds, cremation grounds, places of worship, railway lines, stream/river/canal, water mains, sewers, gas/oil pipes, crossings, trees, plantations, utility services such as electric and telephone lines (O/H & U/G) and poles, OFCs etc. The survey would cover the entire RoW of the road on the adequate allowance for possible shifting of the central lines at some of the intersection locations.

The data collected has been shown on a strip plan so that the proposed improvements can be appreciated and utility removals of each type etc. assessed and suitable actions can be initiated. Separate strip plan for each of the services involved will be prepared for submission/coordination with the concerned agency.

The data from the topographic survey has been in x, y, z format for use in the Digital Terrain Model (DTM).

Traffic studies

All traffic surveys and studies required for the project road has been carried out as per the relevant IRC specifications.

- *Classified volume counts of vehicles has been conducted for trucks, multi axle trucks (rigid and articulated separate), buses, cars, LCV (jeeps and vans), autos, two wheelers, cycles (two and three wheels separately) and carts.*
- *Duration for traffic survey:*
  - *For mid-block section, volume counts (straight counts) have been conducted for 1 day 16 hours in both the direction.*
  - *For junctions, volume counts (straight counts) have been conducted for 1 day 16 hours in both the directions.*
  - *Split volume count has been every 15 minutes.*

- *Traffic survey at mid-block locations has been simultaneously started in both the directions.*
- *The volume count has been recorded in the prescribed format.*

Road Inventory

Preliminary inventory of the project road has been carried out covering but not limited to the following points:

- *Existing RoW*
- *Abutting land use pattern*
- *Existing number of lanes and lane width*
- *Type, width and condition of carriageway, shoulders, footpath, median and roadside drains*
- *Existing Trees, Lighting and Road Furniture.*
- *Condition of Sign Boards and Road Markings*
- *Details about existing type of parking*
- *Details of encroachment on footpath, shoulders*
- *Details of cross roads*

Pavement Condition Survey

- *The objective of the road and pavement condition survey has been to identify defects and sections with similar characteristics. All defects shall be systematically referenced, recorded and quantified for the purpose of determining the mode of rehabilitation.*

- *The pavement condition surveys have been carried out using visual means. Supplemented by actual measurements and in accordance with IRC 82, 37 and relevant codes.*
- *The shoulder and embankment conditions has been evaluated by visual means and the existence of distress modes (cuts, erosion marks, failure, drops) and extent (none, moderate, frequent and very frequent) of such distress manifestations will be recorded.*
- *For sections with severe distresses, additional investigations as appropriate have been carried out to determine the cause of such distress.*

Detailed field studies have been carried out to collect road and pavement surface conditions. The data will cover the following:

- *Pavement composition: The data concerning the pavement composition has been ascertained by trial pits. At each test, test pit reference (identification number, location), pavement composition (material type and thickness), subgrade type (textural classification) and condition (dry, wet) was recorded.*
- *Detailed field studies have been carried out to cover the pavement distress type such as cracking, raveling, potholing, edge break, rut depth and the extent of the same will be recorded.*
- *Shoulder condition details like: paved, unpaved(material loss, rut depth and corrugation) and edge drop will be recorded.*

Benkelman Beam Deflection

Benkelman Beam Deflection (BBD) survey has been carried out in accordance with IRC: 81-1997, test points to be at 100m interval excluding in stretches where more readings are required.

- *Survey should be conducted for 100 m of intervals for each 3.5 m carriageway*

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- *Temperature reading of pavement for every one hour of interval of time*
- *Soil sample collection for every 1 km intervals staggered*

The BBD survey was not been carried out on badly damaged sections; instead test pits will be dug on each section not exceeding 100 m length to a depth of minimum 500 mm below subgrade level. The pavement layer types and thickness has been recorded and tests were made on samples taken from the bottom of the pit. Regular test pits as required by the BBD survey has been dug at the edge of the road, so as to record layer types and thickness in both carriageway and shoulder. Such test pits were located next to a BBD test location. The interval of such test pits were 1 km as specified by IRC: 81, which was include:

- *Atterberg's limits and Grain size*
- *In situ density and Moisture content*

Sub Soil Investigationslimited to selected locations

Detailed field studies have been conducted. Test pits were dug along road sections, which require widening. The minimum distance within such sections was 500 m, closer intervals were used where swelling soils and other unsuitable soils appear to be present. Test pits have been 1.0 m X 1.0 m and were dug to 1.5 m depth. The soil strata were recorded and samples taken at 1.0 m depth have been tested for Atterberg Limits and Grain Size.

Traffic network flow mapping and existing signal timings

The traffic signal timing during peak and off peak hours are noted and signal timings optimized based on the traffic flow. At junctions where signals do not exist the need for traffic signals were ascertained based on the flow of traffic.

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Existing RoW mapping – Cross section detailing and strip plan with entry exit mapping

The data from the topographic survey and the typical cross section developed for the project road is used as the input for mapping existing RoW, preparation of strip plan with entry exit mapping and cross section detailing.

Identification of existing utility lines on survey drawing

Existing utilities along the project road such as electric poles, transformers, lighting, etc. has been identified during the topographical survey. The details of sub surface utilities were collected from concerned department and same has been superimposed on the alignment plan.

Detailed Design of Road and Pavements, drainage and traffic furniture

Detailed designs have been done and working drawings were prepared for the following:

- *Design of pavement, paved shoulders, medians, sidewalk*
- *Preparation of alignment plans, longitudinal sections and cross sections at 50 m intervals*
- *Designs for road furniture and road safety/ traffic control features*
- *Drainage design showing location of road side drawings, inlets, kerbs, etc.*
- *Cross drainage structures plan with drawings if changes required as per the investigation conducted.*
- *Pavement design has been carried out as per standards.*

Geometric Design

- *Project road have uniform lanes and cross section features. Hence the design of geometric elements were therefore, taken into account the essential requirements of such facilities.*

- *Based on the data collected from reconnaissance and topographic surveys, the sections with geometric deficiencies, if any, would be identified and suitable measures for improvement would be suggested for implementation*
- *Major junctions were designed and provided with channelizing islands, storage lanes, free left turns, proper cross fall, drainage, etc.on.*
- *The provision of appropriate markings and signs were made wherever the existing site conditions do not permit the adherence to the sight distance requirements as per the standard norms.*

Data Collection from Client and other Departments

The Consultant has been collect all available relevant data and information concerning the road i.e., past traffic data, existing utilities within the Right of Way, social and environment data.

The departments / organizations from which the data is proposed to be collected are given in ***Table***

Table: Data collection:

No.	*Description*	*Authority*	*Contact Address*
A.	***Meteorological department***		
1.	*Rainfall data*	*Assistant*	*Meteorological department,*

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No.	Description	Authority	Contact Address
2.	Temperature	director	Bengaluru
B.	**Water supply department**		
3.	Details of Water supply utilities along the project road.	Executive Engineer,	BWSSB, Bengaluru

5 Design Standards & Code of Practice

General

Planning and Designing of Roads and CD Structures, Pedestrian Facilities and Street Furniture are essentially based on the IRC Standards and Mort&H Specifications. Wherever the Codes/ Standards are silent on some of the Aspects, the same has been planned /designed based on the Sound Engineering Practices. Design Standards relevant to the Project Road along with the Broad List of Design Parameters and the relevant IRC Codes/ Specifications have been detailed in ***Table 5.1 Design Standards.***

Table 5.1: Design Standards

Sl. No	Design Parameters	Reference Code
1.	Geometric Design Standards • Carriageway Width • Shoulder • Footpath • Median • Camber • Super Elevation • Horizontal Alignment • Vertical Alignment	As per IRC: 38, IRC: 86 and IRC: SP: 23
2.	Parking Facilities	As per IRC: SP:12

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3.	Road Furniture • Road Delineators • Road Markings • Road Signs	As per IRC: 79 As per IRC: 35 As per IRC: 67
4.	Pedestrian Facilities	As per IRC: 103
5.	Road Capacity	As per IRC: 106
6.	Design of Flexible Pavement	As per IRC: 37
7.	Overlay Design	As per IRC: 81
8.	Road Drainage	As per IRC: SP: 42 and IRC: SP:50
9.	Culverts	As per Relevant IRC Codes and MoRTH Specifications
10.	Bridges	

The Project Road Section passes through Plain Terrain. Design Standards (as Appropriate) have been further elaborated under the following heads.

- Geometric Design
- Pavement Design
- Drainage
- Road Furniture and Appurtenances.
- Bridges and CD Structure.

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National Standards have been studied and based on that suggested Standards for City Roads of Bangalore have been recommended for Approval and for Designing of Roads, Road Intersections, etc.. accordingly.

Design Standards Related to Geometric Design

Design Standards related to Road Geometric along with the suggested Design Values/ Standards and Recommended Values based on Site Conditions and Data Analysis are detailed in ***Table 5.2***

Geometric Design Standards.

Table 5.2: Geometric Design Standards

Sl. No.	Design Parameters	Design Values*
1.	Design Speed • Arterial Road • Sub Arterial Road • Collector Street • Local Street	 80kmph 60kmph 50kmph 30kmph
2.	Geometric Design Standards	
	• Carriageway Width	Single lane without kerb – 3.5m Two lane without kerb - 7m Two lane with kerb - 7.5m Three lane with or without kerb - 10.5/11m Four lane with or without kerb - 14m

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		Six lane with or without kerb - 21m
	• *Land Width*	*Arterial Road - 50-60m* *Sub Arterial Road - 30-40m* *Collector Street - 20-30m* *Local Street - 10-20m*
	• *Median*	*Absolute Minimum Width – 1.2m* *Desirable Minimum Width – 5.0m*
	• *Footpath*	*Minimum Width – 1.5m*
	• *Camber*	*1.7-3.0% for paved Carriageway*
	• *Kerb*	*Barrier/ Semi Barrier / Mountable (Semi Barrier type recommended)*
	• *Super Elevation*	*Limited to 4% on Urban Section*
	• *Minimum Radius of Horizontal Curve*	*40m for a Speed of 30kmph* *105m for a Speed of 5kmph*
	• *Extra Widening at Curves*	*Nil for Radius above 300m*
	• *Gradient*	*Maximum Gradient – 4%(1in 25)* *Minimum Gradient for Drainage – 0.5% (desirable Minimum) and 0.3& (Absolute Minimum)*

(Reference Code: IRC: 86 "Geometric Design Standards for Urban Roads in Plains")

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Design Standards Related to Pavement Design

Design Standards related to Pavement Design are essentially based on the Guidelines given in IRC: 37 "Guidelines for Design of Flexible Pavements", IRC: 58 "Guidelines for Design of Rigid Pavements for Highways" and Overlay Design are essentially based on IRC: 81 "Guidelines for Strengthening of Flexible Road Pavements Using Benkelman Beam deflection Technique". The suggested Design Values / Standards and Recommended Values based on Site Conditions and Data Analysis are detailed in ***Table 5.3***

Pavement / Overlay Design Standards.

The same have been adopted for the Design.

Table 5.3: Pavement / Overlay Design Standards

Sl. No.	Design Parameters	Reference Code / Design Values
1.	• Pavement Design	IRC: 37 "Guidelines for Design of Flexible Pavements" IRC: 58 "Guidelines for Design of Plain Jointed Rigid Pavements for Highways"
	• Traffic Growth Rate	Estimated Annual Growth Rate
	• Design Life	15-20 years for Arterial and Sub Arterial Road 10-15 years for Local and Collector Streets
	• Vehicle Damage Factor	As per the Data collected and compiled

	• Lane Distribution Factor	As per IRC: 37
	• Minimum Thickness	Sub Grade – 500mm Sub Base – 150/200mm(<10msa/>10msa) Base – 225/250mm (<2msa/>2msa) Bituminous Surfacing – Desirably 40mm thick, to prevent Ingress of Water through surface
2.	• Overlay Design	IRC: 81 "Guidelines for Strengthening of Flexible Road Pavements Using Benkelman Beam Deflection Technique"
	• Design Life	At least 10 years
	• Correction Factors	Temperature Correction Factor. Correction for Seasonal Variation (inclusive of Correction for Moisture Content, Soil type and Rainfall)
	• Minimum Thickness	From Structural Considerations, the recommended Minimum Bituminous Overlay 40mm Bituminous Concrete (BC), Concrete Pavement at Junction.
3.	Wearing Course Material	Bituminous Concrete with Plastic Waste
4.	Mastic Asphalt	Existing concrete surface.

Design Standards Related to Road Drainage

Drainage of Water from Pavement Surface is of paramount importance as far as preserving the Road Assets created by investing huge funds in addition to maintenance of Structural Soundness and Functional Efficiency of the Road. Design Standards related to Road Drainage are essentially based on the Guidelines given in IRC: SP: 42 "Guidelines on Road Drainage" and in IRC: SP; 50 "Guidelines on Urban Drainage". The suggested Design Values / Standards are detailed in ***Table 5.4 Design Standards Related to Road Drainage.***

Table 5.4: Design Standards Related to Road Drainage

SL. No.	Design Parameters	Design Values
1.	• Camber	1.7-3.0%(bi directional) for Carriageway
	• Longitudinal Gradient	Minimum 0.3% for satisfactory Drainage
	• Drain Type	i. RCC Box Drain with Precast RCC Cover Slab / Deck Slab.

Design Standards Related to Road Furniture and Appurtenances

Utility and Importance of the Road are greatly enhanced by installing Road Furniture and Appurtenances at Appropriate Locations along the Project Road, which ensures Improved Road Safety. Planning and Designing of Road Furniture and Appurtenances are as per the Guidelines stipulated in IRC. Detailing of each of these Components has been done so that to integrate the same with the Road Improvement Scheme. The suggested Design Values / Standards are detailed in

Table 5.5

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Design Standards Related to Road Furniture and Appurtenances

Table 5.5: Design Standards Related to Road Furniture and Appurtenances

SL. No.	Design Parameters	Reference Code / Design Values
1.	Road Markings	IRC: 35 "Code for Practice for Road Markings".
2.	Road Signs	IRC: 67 "Code of Practice for Road Signs".
3.	Road Delineators	IRC: 79 "Recommended Practice for Road Delineators".
4.	Pedestrian Facilities	IRC: 103 "guidelines for Pedestrian Facilities".
5.	Railings	100 meters Before and After the Bridges

In addition to the above Measures, various other Integral Road Components have been planned so that to achieve the Maximum and Optimal use of the Carriageway with no / least Interference to Traffic Flow and at the same time ensuring Adequate Facilities to other Road Users especially Pedestrians. All the Encroachments, if any shall be cleared within the ROW.

6 Engineering Surveys & Analysis

General

Various Surveys and Investigations that are essential Inputs for Detailed Engineering Design are detailed in this chapter. All the relevant Maps / Data / Details available with the Concerned Departments have been collected, compiles and reviewed. Particular Attention has been given to Past / Historical Data / Reports. A Review of the Past data available in the various studies has been listed out and such Available Data has been made use of, after updating / augmenting the Data wherever necessary. The data as collected have been made use of Analysis, Design, Formulation of the Improvement Proposals and Costing. The activities have been performed on several fronts fully complying with Requirements. The activities that have been carried out are succinctly brought out hereunder.

The Various Engineering Surveys / Investigations of the Road Sections include:

- *Reconnaissance Survey.*
- *Topographical Survey.*
- *Benkelman Beam Deflection Survey.*
- *Test Pit Investigation Survey.*

Reconnaissance Survey

Reconnaissance Survey of the Project Corridors, considered for Improvements for a total length of 10.30 Km, has been carried out to identify the General Condition of Roads, drains, Culverts and Bridges for further Surveys / Investigations, to understand the Kind Establishments along the Project Stretch. Making use of the Observations / Data Collected during Reconnaissance Survey,

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Detailed Schedule for Surveys / Investigations required for the project hasbeen finalised.

Topographical Survey

Topographical Survey has been carried out using Total Station based on the Requirements initiated in the Reconnaissance Survey. A Comprehensive Topographic Survey has been conducted all along the Corridor using Total Station Equipment to accurately map the area and obtain the Present Information on Road Width, Adjoining Land Use, building offsets and Levelling Data using Auto Level. The Profiles and Levels of the Road Network within the Study Area have been also captured by taking Longitudinal and Cross Sectional Levels. The Extent of Survey has been limited to 100m beyond the Battery Limit on Both sides of the Project Corridors. The Details have been Captured adequately for Planning and Designing of proposed Corridor Development Scheme. The Data Captured is in 3D Format which have been directly downloaded to Computers and is compatible for Modern Design Softwares. Topographical Map is given in ***Volume III- Drawings***.

Road Inventory and Condition Survey

A Detailed Inventory and Condition Survey of Road Sections have been carried out by making use of well structured Inventory Data Format. Various Data collected during the Road Inventory broadly include:

- *Road Length and Number of Lane.*
- *Surface Type and Condition.*
- *Shoulder, Median, Drain (Tertiary/ Shoulder), Footpath- Type and Width.*
- *Right of Way.*
- *Cross Drainage and Bridge Structures.*

- *Land use type.*
- *Road Furniture.*
- *Illumination.*
- *Utility Data.*
- *Trees.*
- *Details of Major Junctions.*
- *Bus/ Auto Stops.*
- *On street Parking.*

All the above Information have been compiled and presented (Chainage wise) in the form of tables for easy understanding below. The data captured with respect to Road Geometry have been made use of to identify the Scope for Improvement in Road Geometry and Width of Carriageway.

Pavement Condition Survey the Pavement Condition Survey has been carried out in accordance with IRC Guidelines. All surveys and investigations have been carried out with the following objectives

❖ *To have an up to date record of road assets.*

❖ *To have a clear understanding of road side features including land use, drainage characteristics, etc. and*

❖ *To assess the condition and strength data for developing improvement proposals and related designs.*

Visual Condition Survey Visual Condition Survey of the road sections has been carried out by travelling along the project road and noting down the pavement conditions such as extent of cracking, patching, rutting, pot holes, edge breaking, etc. by visual observations in a well structured data format. The data

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so collected has been compiled and presented (kilo metre wise) in the form of tables for easy understanding. This data has been used to assess the pavement condition.

Sub-Grade Characteristics and Strength The data relating to soil classification and mechanical characteristics for soils along the existing alignments were collected. For the widening of the existing road within the ROW, testing is being performed on at least three sub-grade soil samples for each homogenous road segment or three samples for each soil type encountered whichever is more. The sub-grade soil is being tested as follows:

- In-situ density and moisture content at each test pit.
- Field CBR at each test pit.
- Characterisation (grain size and Atterberg limits) at each test pit.
- Laboratory moisture-density characteristics (modified AASHTO compaction).
- Laboratory CBR (unsoaked and 4-day soak, compacted at three energy levels) and swell. ➢ Objective The objective of the investigations is to provide basis for design of various types of pavements viz. pavement option study for the project road, keeping in view the composition and characteristics of the existing pavement/sub grade. The scope of work thus includes:
- Collection of information regarding the existing pavement crust composition and characteristics.
- Existing Sub grade type and sub-soil conditions.

➢ Methodology for Sub-grade Soil and Pavement Crust Investigations Test pits of approx. 1.0 m x 1.0 m size staggered along the edge of the existing pavement on both sides are excavated up to sub grade level (up to 1.5m depth) at regular intervals along the road alignment. These test pits are excavated on shoulders extending about 20 cms into the pavement. Bulk sample of about 30kg was

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collected from all the test pits at natural ground level to analyze the characteristics of the existing sub grade material. Field Density tests were conducted for all the test pits and also the natural moisture content were determined at each test pits. The following laboratory tests were conducted for all the samples collected from the test pit.

- Grain Size Analysis (As per IS: 2720 –Part 4).
- Atterberg limits test (As per IS:2720-Part 5).
- Standard proctor tests (As per IS: 2720 - Part 8).
- Soaked CBR tests (4-days soaked).

Traffic Surveys The programme for traffic studies and the location of traffic surveys have been finalised after reviewing in detail the available traffic data. Particular attention has been paid to identify gaps and further data requirements of the study. The traffic surveys have been designed for filling up data gaps as well as updating the information. The locations of the survey stations have been reviewed considering the suitability of various types of traffic surveys. Traffic surveys have been carried out at selected locations for updating the traffic information. Following surveys have been conducted:

- Traffic Volume Count. These surveys have been carried out in accordance with IRC: SP – 19 – 2001 and IRC: SP – 41 – 1994.

Traffic Volume Count For ascertaining the present traffic flows on various road stretches, classified traffic volume counts have been undertaken to ascertain the type and number of operating vehicles. Data has been analyzed to identify peak hour flows and composition of traffic. PCU factors are as per IRC: 106 – 1990 "Guidelines for Capacity of Urban Roads in Plain Areas". These field surveys carried out in a scientific manner have led to a realistic data bank based on which the design and cost of construction of the pavement is being developed. Data derived from the survey has been analyzed to identify requirements of

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suitable remedial measures such as junction improvements; widening of ROW; pedestrian crossings etc.

Test Pit Investigation Survey

Test Pit Investigation Survey of the Road Sections has been done as required. Testing has been carried out so that to match the Locations of the CBR Test in that Road Section. Soil Samples have been collected and tested in Laboratory for

- *Field Moisture Content.*
- *Grain Size Analysis.*
- *Atterberg's Limits.*
- *Classification of Soil.*
- *Maximum Dry Density – Optimum Moisture Content Test.*
- *California Bearing Ratio (CBR) on 4 days Soaked Samples.*

Sub Grade Characteristics and Strength Parameters so determined are required in respect of

- *Existing Sub Grade to design Widening of Existing Roads and to check Strengthening Requirements of Existing Pavements by the CBR Method, and*
- *Prospective Borrow Material for use as Sub Grade in case of New Alignment, Reconstruction and Widening.*

Secondary Data

Details of any Ongoing Developmental Works along the Project Roads such as Road Improvements, Junction Improvements, Grade Seperation Schemes, Footpath Improvement Schemes, NICE Corridor Scheme, Metro Rail Alignment, White Topping, Signal Free Corridor etc. have been collected so that to integrate the same with the Improvement Proposals suggested and also to avoid Duplication which will have a direct bearing on the Project Cost.

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7 Design proposal

General

Improvement proposals for an existing road cross section essentially consist of two components, geometric and structural improvements. The geometric improvements mainly involve, cross sectional elements such as carriageway, shoulders etc. The structural component deals with the pavement design aspects, i.e., the ability of the roads to adequately carry and support the vehicle / wheel loads over the design period. Improvements to geometry are based on relevant IRC standards. Safety, speed, efficiency, economy and comfort in traffic movement to a large extent are governed by adequacy of design standards used for a specific road facility. The present chapter illustrates the design proposals for the project road.

Improvement Proposals

Geometric design

Geometric design of roadways deals with the positioning of the physical elements of the roadway according to standards and constraints. The basic objective in geometric design is to provide a smooth-flowing, crash-free facility. Geometric design comprises of improvements in horizontal and vertical geometrics of the existing road. The geometric design is optimized within the frame work of contract and approving authority.

Terrain and Land Use

The Geometric design of the project Road is influenced significantly by terrain condition. Economy dictates choice of different standards for different type of

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terrain. Terrain is classified by the general slope of the country across the project alignment, for which the criteria given in ***Table 7.1*** *are followed.*

Short isolated stretches of varying terrain are not taken into consideration.

Table 7.1 General Guidelines for Terrain Classification

Terrain Classification	***Percent Cross Slope***
Plain	***0 – 10***
Rolling	*10 – 25*
Mountainous	*25 – 60*
Steep Terrain	*Greater than 60*

Since the percentage cross slope along the alignment is predominantly ranging between 0 - 10%, the project road is classified as Plain terrain.

Cross sectional element

The present project envisages 1 lane traffic movements, with undivided carriageway configuration. Topographical survey and road inventory has confirmed the availability of RoW varying between 10 to 15 metres. The details of cross sectional element as indicated in drawings and Sketches.

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Planning and design of roads & CD structures, pedestrian facilities and street furniture are essentially based on the IRC standards and MoRT&H specifications. Whenever, the codes / standards are silent on some of the aspects, the same has been planned / designed based on sound engineering practices. Design standards relevant to the project road along with the broad list of design parameters and the relevant IRC codes / specifications have been detailed in ***Table 7.2***

Sl. No.	*Design Parameters*	*Reference Code*
1	*Geometric Design Standards • Carriageway width • Shoulder • Footpath • Median • Camber • Super Elevation • Horizontal Alignment • Vertical Alignment*	*As per IRC: 38 – 1988, IRC: 86 – 1983 & IRC: SP : 23 – 1993*
2	*Road Furniture • Road Delineators • Road Markings • Road Signs*	*As per IRC: 79 – 1981 As per IRC: 35 – 1997 As per IRC: 67 – 2001*
3	*Road Capacity*	*As per IRC: 106 – 1990*
4	*Flixible Pavement Design*	*As per IRC: 37 – 2012*
5	*Road Drainage*	*As per IRC: SP: 42 – 1994 & IRC: SP: 50 – 1999*

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6	Road Drainage	As per relevant IRC codes and MoRT&H specifications
7	Bridges	

The project road section passes through plain terrain. Design standards (as appropriate) have been further elaborated under the following heads:

- Geometric Design
- Pavement Design
- Drainage
- Road Furniture and Appurtenances
- CD Structures

Design Standards Related to Geometric Design

Design standards related to road geometric along with the suggested design values / standards and recommended values based on site conditions and data analysis are detailed in **Table 7.3:**

Sl. No.	Design Parameters	Design Values
1	Design Speed	Design speed Considered is 40 kmph.
2	Geometric Design	

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	Standards	
2a	• Carriageway Width	Two lane carriageway
2b	• Camber (Bi – directional)	2.5% for paved carriageway.
2c	• Super Elevation**	Limited to 4%.
2d	• Footpath	Minimum width – 1.5m
2e	• Kerb	Barrier / Semi – barrier / Mountable (Barrier type recommended)
2f	• Minimum Radius of Horizontal Curve	40 m for a speed of 30 kmph 105 m for a speed of 50 kmph
2g	Extra Widening at Curves	Nil for Radius above 300 m
2h	• Gradient	Maximum Gradient – 4.0 % (1 in 25) Minimum Gradient for Drainage – 0.5 % (desirable minimum) & 0.3 % (absolute minimum).

(* - Reference Code: IRC: 86 – 1983 – "Geometric Design Standards for Urban Roads in Plains")

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Design Standards Related to Pavement Design Design standards related to Overlay design are essentially based on the guidelines given in IRC: 81 – 1997 "Guidelines for Strengthening of Flexible Road Pavements Using Benkelman Beam Deflection Technique". The suggested design values / standards and recommended values based on site conditions and data analysis are detailed in ***Table7.4****. and are adapted in the design.*

Overlay Design Standards

Sl. No.	*Design Parameters*	*Reference Code / Design Values*
1	*Rigid Pavement*	*Design IRC: 81 – 1997 "Guidelines for Strengthening of Flexible Road Pavements Using Benkelman Beam Deflection Technique"*
	Design Life	*15 years*
	Correction Factors	*Temperature Correction Factor. Correction for Seasonal Variation (inclusive of correction for moisture content, soil type and rainfall)*
	Minimum Thickness	*From structural considerations recommended minimum Dry lean concrete of 150mm thick and unreinforced plain cement concrete of 300mm thick*
2	*Wearing Course Material (Options)*	*Unreinforced Plain Cement Concrete*

Design Standards Related to Road Furniture and Appurtenances

Utility and importance of the road are greatly enhanced by installing road furniture and appurtenances at appropriate locations along the project road, which ensures improved road safety. Planning and design of road furniture and appurtenances are as per the guidelines stipulated in IRC. Detailing of each of these components has been done so as to integrate the same with the road improvement scheme. The suggested design values / standards are detailed in ***Table 7.5***

Design Standards Related to Road Furniture and Appurtenances

Sl. No.	Design Parameters	Reference Code / Design Values
1	Road Markings	IRC: 35 – 1997 "Code of Practice for Road Markings".
2	Road Signs	IRC: 67 – 2001 "Code of Practice for Road Signs".
3	Road Delineators	IRC: 79 – 1981 "Recommended Practice for Road Delineators".
4	Pedestrian	Facilities IRC: 103 – 1988 "Guidelines for Pedestrian Facilities".

In addition to the above measures various other integral road components have been planned so as to achieve the maximum and optimal use of the carriageway with no / least interference to traffic flow at the same time ensuring

adequate facilities to other road users especially pedestrians. All the encroachments, if any shall be cleared within the ROW.

Horizontal Geometry

In road alignment, design changes in direction are often necessary due to restriction imposed by topography, environment, restriction in roadway, presence of monuments, places of worship, existing structures, built up area and other considerations such as available land. For convenient, safe and pleasant travel on road, changes in directions have to be accomplished by introducing horizontal and transition curves in the alignment. However in case of urban roads the horizontal alignment is maintained as per existing without subjecting it to widening, as land acquisition is prohibited.

Vertical Geometry

The vertical alignment of a road consists of gradients (straight lines in a vertical plane) and vertical curves. In determining the type and length of the vertical curve, the design considerations are comfort and security of the driver, and the appearance of the profile alignment. Among these, sight distance requirements for the safety are most important on summit and valley curves. The stopping sight distance or absolute minimum sight distance is considered in case of summit curves and headlight sight distance is considered for valley curves. When a fast moving vehicle travels along a summit curve, there is less discomfort to the passengers. This is because the centrifugal force will be acting upwards while the vehicle negotiates a summit curve which is against the gravity and hence a part of the tyre pressure is relieved. Also if the curve is provided with adequate sight distance, the length would be sufficient to ease the shock due to change in gradient. Circular summit curves are identical since the radius remains same throughout and hence the sight distance. From this point of view, transition curves are not desirable since it has varying radius and so the sight distance will also vary. The deviation angle provided on summit curves for

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highways is very large, and so the simple parabola is almost congruent to a circular arc, between the same tangent points. Parabolic curves are easy for computation and also it had been found out that it provides good riding comfort to the drivers. It is also easy for field implementation. Due to all these reasons, a simple parabolic curve is preferred as summit curve.

Improvements to vertical alignment are taken into consideration by providing profile corrective course in addition to the overlay proposed as per BBD studies. ***Table 7.6*** *indicates the overlay proposed to Roads*

SL no	Road Name	Proposed thickness (mm)
1	8th A Cross Road, Last Cross Road	150mm thick WMM, 50mm BM and 40mm BC
2	5th Cross Road	50mm Bm and 40mm BC

Storm Water Drain

Storm Water Drain along the project roads observed are of SSM type. Covered/Uncovered SSM drain exists predominantly along the project roads. Further, the revised cross section proposal consists of Storm water drain of 0.9 and 1.2 m width is proposed along the kerb edge.

Road furniture

Traffic Signs and Pavement Markings

Pavement markings will include road marking along the Project Roads. The design and marking for the Project Roads will be as per the IRC guidelines.

Analysis of Traffic Data was processed on hourly basis to establish the peak hours. Data collected from surveys were computerized and analyzed to study hourly variation of traffic, peak hour flows, traffic composition, etc. The counts were classified by category of vehicles and by direction of movement. The various vehicle types having different sizes and characteristics were converted into equivalent passenger car units. The Passenger Car Unit (PCU) factors recommended by Indian Road Congress in "Guidelines for Capacity of Urban Roads in Plain Areas" (IRC: 106 – 1990) have been. The same are detailed in

Recommended PCU Factors for Various Types of Vehicles on Urban Roads

VehicleType	Equivalent PCU	
	Factors % Composition of Vehicle type in Traffic stream	
	UPTO 10%	ABOVE 10%
Fast Moving Vehicles		
Two wheelers, Motor cycle or Scooter, etc	. 0.5	0.75

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Passenger Car, Pick up Van	*1.0*	*1.0*
Auto-rickshaw	*1.2*	*2.0*
Truck or Bus	*2.2*	*3.7*
Agricultural Tractor Trailer	*4.0*	*5.0*
Slow Moving Vehicles		
Cycle	*0.4*	*0.5*
Cycle rickshaw	*1.5*	*2.0*
Tonga (Horse drawn vehicle)	*1.5*	*2.0*
Hand cart	*2.0*	*3.0*

Design Traffic Peak hour traffic is taken as design hour traffic for urban roads. Maximum of morning and evening peak flow is taken as design hour traffic. Cumulative Standard Axles for Pavement Design Traffic projections available from traffic study have been used for design of pavements. The design traffic is considered in terms of cumulative number of standard axles to be carried during the design life of the road. Its computations involves estimates of the initial volume of commercial vehicles per day, lateral distribution of traffic,

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the growth rate, the design life in years and the vehicle damage factor to convert commercial vehicles to standard axles.

The following equation is used to compute the design traffic in terms of the cumulative number of standard axles.

$$Ns = \frac{365 \times [(1+r)^n - 1]}{r} \times A \times D \times F$$

Where,

Ns = Cumulative number of standard axles to be catered for in the design

A = Initial Traffic, in terms of commercial vehicles per day modified to account for lane distribution.

r = Annual growth rate of commercial vehicles (Growth rate adopted as per the recommendation Chapter 3).

n = Design life in years (10 years)

F = Vehicle Damage Factor

The design traffic computed in terms of cumulative number of standard axles (msa).

Pavement Design

The following guidelines have been followed for design of new pavement and for design of overlays for the existing pavements.

- *AASHTO guide for design of pavement structures, 1993.*
- *Guidelines for design of flexible pavements IRC-37, 2001.*
- *IRC: 81 - 1997 Guidelines for Strengthening of Flexible Road Pavement using Benkelman Beam Deflection Technique. 4.5.1 Design of Flexible Overlay Pavement.*

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The following inputs are considered for designing the flexible pavement as per IRC guidelines.

- *Design Traffic in terms of cumulative number of standard axles (msa)*
- *Annual Average Pavement temperature is taken as 350C.*
- *Characteristic Deflection for Overlay Design.*
- *Characteristic Deflection Existing pavement is Very Less Hence we Provided only 40mm BC for Functional Correction.*
- *Utility Ducts are Provide for Avoiding of Cable Complexities.*
- *New BS Drain Provided at Spot of Water stagnation on Road*

Proposed Improvements to Road Section The proposals for the improvement of the geometric elements of the existing project road sections generally include: Geometric Improvements

- *Maintaining Uniform Carriageway.*
- *Improvements to cross sectional elements*
- *Road Furniture and Appurtenances*
- *Provision of New kerb Stone and Painting.*
- *Provision of Thermoplastic paint for Lane marking to road.*
- *Bituminous Concrete for Resurfacing of Road about 40mm. d. Road Drainage*
- *Provision of 100mm Precast Slab for existing drain*
- *New Precast 250mm Slab Provided for BS Cover.*

8 Cost Estimate

General

Cost estimation for the project roads has been prepared based on the design proposals. The cost estimate is prepared for overlay of existing pavement, cross drainage, longitudinal drains, junction improvements, road furniture, etc.,

Rate analysis

Unit rates are adopted for the items of project based on the schedule of rates PWP & IWT department SR 2018-2019 Bangalore circle. Since the project road falls in Bhruhat Bengaluru Mahanagara Palike limits for roads and bridges area weightage of 6% and 8% for Buildings above basic rates is considered.

Project costing

The abstract of estimated cost for Flexible Pavement for each location per Km, According to Schedule of Rates 2018-2019 (PWP & IWTD, Bangalore).

Data rate for 100mm thick precast slabs.
Data rate for 250mm thick precast slabs.

Road Furniture

Road furniture such as lane marking, road studs, zebra crossings, sign boards, pavement markings, etc. have a provision in the cost estimate.

Estimated project cost

The cost estimate is prepared by working out the quantities of each item based on the improvement proposal, by using the relevant drawings developed. The

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estimated cost of construction is Rs 100.00 Lakhs. The BoQ of cost estimates is attached with this report in separate sheets.

9 CONCLUSION

The ***Project: Improvements to Roads and drais in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli,*** *In absence of Adequate Mass Transportation System, the use of personal motor vehicles for intra city travel has increased substantially. This has resulted in growth of motor vehicles, which is eight times the rate of population growth in the last two decades (1.91 Lakh vehicles in 1981 and 38.86 Lakh vehicles in 2011). The Public Transport System (Bus) is overstressed carrying about 50 Lakh Commuters on a daily basis. Congested Streets and Longer Route Length due to Urban Sprawl have only served to reduce Bus Frequencies further.*

The spurt in the development of Bangalore City with creation of ITPL, Tech Parks, Layouts, and Education Institutions has resulted in change of the Land Use Pattern. Further, Bruhat Bangalore Mahanagara Palike has decided to take up the development of various Arterial and Sub Arterial roads in and around Bangalore City where the intensity of traffic has increased significantly and there is a requirement for augmentation of capacity for safe and efficient movement of traffic. This being the Background, Bruhat Bangalore Mahanagara Palike has proposed for the following works in order to provide Seamless Traffic Flow and to Increase Level of Service along the Project Stretch. For the proposed Improvement Scheme, total Cost of the Project has been worked out as ***Rs.100.00 Lakh.***

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ESTIMATES

BRUHAT BENGALURU MAHANAGARA PALIKE
YELAHANKA ZONE

NAME OF WORK : Improvements to Roads and drais in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli

								Est Cost	100.00 Lakhs
Sl. No	Description of Item	Unit	No.	Length	Width	Depth	Quantity	Rate	Amount
1	KSRRB300-1. Earthwork excavation by manual means for roads, drains & similar works in ordinary soil excavated surface levelled and sides neatly dressed, the disposed earth to be levelled neatly after breaking of clods complete as per specifications.(I.NO 19.1,Page no 143 SR 2018-19)								
	CC Drain								
	TATA Nagar, 6th A Cross Road								
	Ist Main Road LHS	Cum	1	176.55	1.10	1.00	194.21		
	Ist Main Road RHS	Cum	1	180.00	1.10	1.00	198.00		
	2nd Main Road LHS	Cum	1	16.35	1.10	1.00	17.99		
	Tata Nagar 11th Main Road From SWD Towards Railway Crossing								
	LHS Side	Cum	1	165.00	1.10	1.00	181.50		
	RHS Side	Cum	1	165.00	1.30	1.50	321.75		
	Culverts	Cum	5	6.50	1.20	1.00	39.00		
						Total Qty	952.44	215.28	205041.00
	Basic Rate	130.00							
	Area Weightage @ 6%	7.80							
	Loading and Unloading, Lead 8Km (57+2*1.28*8)	77.48							
	Total	215.28							
2	KSRB 4-12: Providing and laying Plain cement concrete 1:3:6 mix with OPC 220kgs with crushed stone aggregate 40 mm and down size graded granite metal coarse aggregates @0.892Cum and fine aggregates @ 0.465Cum machine mixed, machine mixed, concrete laid in layers not exceeding 15 cms. thick, well compacted, in foundation, including cost of all materials, labour, HOM curing complete as per specifications. Specification No. KBS 4.1, 4.2 (P.No-13,I No-4.2 of PWD BCSR 2018-19)								
	CC Drain								
	TATA Nagar, 6th A Cross Road								
	Ist Main Road LHS	Cum	1	176.55	1.10	0.15	29.13		
	Ist Main Road RHS	Cum	1	180.00	1.10	0.15	29.70		
	2nd Main Road LHS	Cum	1	16.35	1.10	0.15	2.70		
	Tata Nagar 11th Main Road From SWD Towards Railway Crossing								
	LHS Side	Cum	1	165.00	1.10	0.15	27.23		
	RHS Side	Cum	1	165.00	1.30	0.15	32.18		
	Culverts	Cum	5	6.50	1.20	0.15	5.85		
						Total Qty	126.78	5989.25	759308.00
	Basic Rate	5194.00							
	Issue Rates as on 02-11-2021: 4.4*103.69	456.24							
	Area Weightage @ 6%	339.01							
	Total	5989.25							
3	KSRB M2200-6 Providing T.M.T bars Fe 500 steel reinforcement for R.C.C work including straightening, cutting, bending, hooking, placing in position, lapping and / or welding wherever required, tying with binding wire and anchoring to the adjoining members wherever necessary complete as per design (laps, hooks and wastage shall not be measured and paid) cost of materials, labour, HOM of machinery complete as per specifications. MORTH Specification NO.1600&2200Specification No. Pg No.229 Item No.28.8.2								
	For Drain at 55kg / Cum	MT	266.61	55.00	14663.39		14.66		
	For Culvert at 80kg / Cum	MT	14.30	80.00	1144.00		1.14		
						Total Qty	15.81	90596.08	1432087.00
	Basic Rate (Issue Rates as on 02-11-2021)	85468.00							
	Area Weightage @ 6%	5128.08							
	Total	90596.08							

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4	Providing laying plain/ reinforced cement concrete for side Drains Using M20 nominal mix Concrete with OPC at 300kgs.With 20mm and Down size granite metal coarse aggregate at 0.69Cum and fine aggregate at 0.43Cum Machne mixed, well compacted for wall and Bottom including centering shuttering,cost of materials,HOM of Machinery,Curing Etc.,Complete Excluding cost of Steel as per morth MORTH specification No. 1500, 1700, 2200. Including Cost of material, Labour, HOM complete as per Specification WALL & Bottom thickness 15Cm(Item No 37.59.2 page no 271)								
	Raft								
	CC Drain								
	TATA Nagar, 6th A Cross Road								
	Ist Main Road LHS	Cum	1	176.55	1.00	0.15	26.48		
	Ist Main Road RHS	Cum	1	180.00	1.00	0.15	27.00		
	2nd Main Road LHS	Cum	1	16.35	1.00	0.15	2.45		
	Tata Nagar 11th Main Road From SWD Towards Railway Crossing								
	LHS Side	Cum	1	165.00	1.00	0.15	24.75		
	RHS Side	Cum	1	165.00	1.20	0.15	29.70		
	Side Walls								
	CC Drain								
	TATA Nagar, 6th A Cross Road								
	Ist Main Road LHS	Cum	2	176.55	0.15	0.60	31.78		
	Ist Main Road RHS	Cum	2	180.00	0.15	0.60	32.40		
	2nd Main Road LHS	Cum	2	16.35	0.15	0.60	2.94		
	Tata Nagar 11th Main Road From SWD Towards Railway Crossing								
	LHS Side	Cum	2	165.00	0.15	0.60	29.70		
	RHS Side	Cum	2	165.00	0.15	1.20	59.40		
	Culverts Raft								
	Culverts	Cum	5	6.50	1.20	0.20	7.80		
	Culverts Side Walls								
	Culverts	Cum	10	6.50	0.20	0.50	6.50		
							Total Qty	**280.91**	**7729.67**	**2171318.00**
	Basic Rate	**6670.00**							
	Issue Rates as on 02-11-2021: 6*103.69	**622.14**							
	Area Weightage @ 6%	**437.53**							
	Total	**7729.67**							
5	Providing and Fixing Pre cast covering Slab 100mm thick made out of CC, jelly 20mm Down size with steel reinforcement including form work,curing,including cost of alll materials, labour,hire charges of machinery, loading, unloading, lead and lift,transportation etc ,complete.As per Engineer incharge. (Data Rate)								
	CC Drain								
	TATA Nagar, 6th A Cross Road								
	Ist Main Road LHS	Sqm	294	0.60	0.90		158.90		
	Ist Main Road RHS	Sqm	294	0.60	0.90		158.90		
	2nd Main Road LHS	Sqm	27	0.60	0.90		14.72		
	Tata Nagar 11th Main Road From SWD Towards Railway Crossing								
	LHS Side	Sqm	275	0.60	0.90		148.50		
	RHS Side	Sqm	275	0.60	1.20		198.00		
							Total Qty	**679.01**	**2337.00**	**1586835.00**
	Data Rate	**2337.00**							
6	Supply and fixing Precast reinforced concrete slab ~~250cm~~ 200MM thick including cost of reinforcement as per design and drawing, material cost, transportation, hire charges of machinery, machine cutting the vertical face to get plain even surface etc., complete with all leads and lift conveynce charges, labour charges inclusive of cost of all materials.								

SHRIYA CONSTRUCTION AND CONSULTANCY

	Culverts								
	Culverts	Sqm	54	0.60	1.20		38.88		
						Total Qty	38.88	5418.00	210652.00
	Data Rate	5418.00							
7	KSRB 4-1.6 ; Providing and laying in position plain cement concrete of Mix 1:2:4 with OPC @ 240kgs, with 20mm and down size graded granite metal coarse aggregates @ 0.878 Cum and fine aggregtes @ 0.53Cum, machine mixed, concrete laid in layers not exceeding 15 cms. thick, well compacted, in foundation, plinth and cills, including cost of all materials, labour, HOM curing complete as per specifications. Specification No. KBS 4.1, 4.2. (P.No-13,I No-4.6)								
	Kerb PCC								
	TATA Nagar, 6th A Cross Road								
	Ist Main Road LHS	Cum	1	176.55	0.20	0.10	3.53		
	Ist Main Road RHS	Cum	1	180.00	0.20	0.10	3.60		
	2nd Main Road LHS	Cum	1	16.35	0.20	0.10	0.33		
	Deduct Shoulder Drain		-15	0.20	0.20	0.10	-0.06		
						Total Qty	7.40	6274.89	46422.00
	Basic Rate	5422.00							
	Issue Rates as on 02-11-2021: 4.8*103.69	497.71							
	Area Weightage @ 6%	355.18							
	Total	6274.89							
8	Providing and fixing pre cast solid cement concrete kerb stones made out of CC 1:2:4 with top and bottom width 114 and 165 mm respectively, 400mm high and 450mm in length finished with CM 1:3 plastering and finishing cutting including formwork, curing, including cost of materials, labour charges of machinery, loading and unloading, lead and lift, transportation ete.,complete. As per the direction of Engineer incharge. (P.No.27, I.No.5.30 of PW, P&IWTD SR 2018-19)								
	Kerb								
	TATA Nagar, 6th A Cross Road								
	Ist Main Road LHS	Nos	1	176.55	/	0.45	392.33		
	Ist Main Road RHS	Nos	1	180.00	/	0.45	400.00		
	2nd Main Road LHS	Nos	1	16.35	/	0.45	36.33		
	Deduct Shoulder Drain		-15	0.20	/	0.45	-6.67		
						Total Qty	822.00	432.48	355499.00
	Basic Rate	408.00							
	Area Weightage @ 6%	24.48							
	Total	432.48							
9	KSRRB 15-51.2 Providing and applying Painting in two coats with plastic emulsion paint of approved brand on wall surace to given an approved shade after throughly brushing the surfce, free from mortordrops and other foreign matter including preparing the surface even and sand paper smooth, cost of materials, labour complete as per specifications. with primer coat (Page No.119. Iitem no.15.51.2 of KPWD S.R Bangalore Circle 2018-2019)								
	Kerb Paint								
	TATA Nagar, 6th A Cross Road								
	Ist Main Road LHS	Sqm	1	176.55		0.35	61.79		
	Ist Main Road RHS	Sqm	1	180.00		0.35	63.00		
	2nd Main Road LHS	Sqm	1	16.35		0.35	5.72		
	Deduct Shoulder Drain		-15	0.20		0.35	-1.05		
						Total Qty	129.47	95.40	12351.00
	Basic Rate	90.00							
	Area Weightage @ 6%	5.40							
	Total	95.40							
10	KSRRB M300-14. Excavation for roadwork in all types of soil by mechanical means including cutting and loading to tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transportation with a lead of 1.00 km and complete as per specifications MORTH Specificatio MORTH Specification No.301Loading and unloading (I No 19.14,P No-143) (8 km lead = 2*1.28X5)								
	Road								
	8th A Cross Road (From First Cross Road	Cum	1	50.00	6.50	0.30	97.50		
	Last Cross Road LHS	Cum	1	55.00	5.50	0.30	90.75		

SHRIYA CONSTRUCTION AND CONSULTANCY

						Total Qty	188.25	63.94	12037.00
	Basic Rate	41.00							
	Area Weightage @ 6%	2.46							
	8 Km lead= (2*1.28*8)	20.48							
	Total	63.94							
11	KSRRB 300-58. Compaction of original ground by mechanical means including filling in depression occuring during rolling including cost of all labour, HOM complete as per specifications.(I No-19.64,P No-147)								
	Road								
	8th A Cross Road (From First Cross Road	Sqm	1	50.00	6.50		325.00		
	Last Cross Road LHS	Sqm	1	55.00	5.50		302.50		
						Total Qty	627.50	6.36	3991.00
	Basic Rate	6.00							
	Area Weightage @ 6%	0.36							
	Total	6.36							
12	KSRRB M400-17. Providing, laying, spreading and compacting cushed stone aggregates of granite / trap / basalt to wet mix macadam specifications including pre mixing the material with water at OMC in mechanical mix plant carriage of mixed materials by tipper to site, laying in uniform layers with paver in sub-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density complete as per specifications(P.No-155,I No-20.18)								
	Road								
	8th A Cross Road (From First Cross Road	Cum	1	50.00	6.50	0.15	48.75		
	Last Cross Road LHS	Cum	1	55.00	5.50	0.15	45.38		
						Total Qty	94.13	2001.28	188370.00
	Basic Rate	1888.00							
	Area Weightage @ 6%	113.28							
	Total	2001.28							
13	Cleaning the existing black topped surface with brooms, soft brushes and finally dusting with old gunny bags and / or compressed air to receive bituminous treatment including cost of all materials, labour, HOM of machineries complete with all lead and lift as per the direction of engineer-in-charge								
	5th Cross Road								
	1st Stretch	Sqm	1	55.00	7.30		401.50		
	2nd Stretch	Sqm	1	240.00	5.90		1416.00		
	8th A Cross Road (Till First Cross Road	Sqm	1	40.00	7.00		280.00		
	8th A Cross Road (From First Cross Road	Sqm	1	50.00	6.50		325.00		
	Last Cross Road LHS	Sqm	1	55.00	5.50		302.50		
						Total Qty	2725.00	5.30	14443.00
	Basic Rate	5.00							
	Area Weightage @ 6%	0.30							
	Total	5.30							
14	KSRRB M500-6. Providing and applying primer coat with S.S. bitumen emulsion on prepared surface of granular base such as WMM including cleaning of road surface and spraying primer at the rate of 0.60 kg / Sqm using mechanical means complete as per specifications Clause 502 of MORTH V revision(P.No-158,I No-21.6)								
	Road								
	8th A Cross Road (From First Cross Road	Sqm	1	50.00	6.50		325.00		
	Last Cross Road LHS	Sqm	1	55.00	5.50		302.50		
						Total Qty	627.50	33.92	21285.00
	Basic Rate (Issue Rates as on 02-11-2021)	32.00							
	Area Weightage @ 6%	1.92							
	Total	33.92							

SHRIYA CONSTRUCTION AND CONSULTANCY

15	KSRRB M500- 15. Providing, laying dense graded bituminous macadam using 40/60 TPH capacity H.M.P with Mechanical paver Gr-II (50mm to 75mm), crushed aggregates of specified grading premixed with 4.5% VG 30 grade bituminous binder and , transporting the hot mix to work site , laying to the required level and grade, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH table 500-10 complete in all respects complete as per specifications MORTH Specification No.507 (P.No.160 It.No.21.17.6)								
	Road								
	5th Cross Road								
	Camber Correction								
	1st Stretch	Cum	1	55.00	1.20	0.05	3.30		
	2nd Stretch	Cum	1	240.00	1.20	0.05	14.40		
	8th A Cross Road (From First Cross Road	Cum	1	50.00	6.50	0.05	16.25		
	Last Cross Road LHS	Cum	1	55.00	5.50	0.05	15.13		
						Total Qty	49.08	8545.72	419381.00
	Basic Rate (Issue Rates as on 02-11-2021)	8062.00							
	Area Weightage @ 6%	483.72							
	Total	8545.72							
16	KSRRB 500-7. Providing and applying tack coat using 80/100 grade bitumen(VG10) on the prepared black topped surfaces at 2.5 kg per 10 Sqm, heating bitumen in boiler fitted with spray set (excluding cleaning of road surface) including cost of all materials, labour, HOM complete as per specifications (P.No-161,I No-21.7)								
	Road								
	5th Cross Road								
	1st Stretch	Sqm	1	55.00	8.50		467.50		
	2nd Stretch	Sqm	1	240.00	7.10		1704.00		
	8th A Cross Road (Till First Cross Road	Sqm	1	40.00	7.00		280.00		
	8th A Cross Road (From First Cross Road	Sqm	1	50.00	6.50		325.00		
	Last Cross Road LHS	Sqm	1	55.00	5.50		302.50		
						Total Qty	3079.00	12.72	39165.00
	Basic Rate (Issue Rates as on 02-11-2021)	12.00							
	Area Weightage @ 6%	0.72							
	Total	12.72							
17	Providing and laying bituminous concrete 40 mm thick with hot mix plant, using crushed aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site, laying with a paver finisher to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 500.9 complete in all respects complete as per specifications. MORTH Specification No. 509 - using40/60 TPH capacity H.M.P. with Mechanical Paver Gr-II (30 mm to 45 mm) with 5.4 % VG-30 Bitumen (P.No-162 I No-21.22.6)								
	Road overlay								
	5th Cross Road								
	1st Stretch	Cum	1	55.00	8.50	0.04	18.70		
	2nd Stretch	Cum	1	240.00	7.10	0.04	68.16		
	8th A Cross Road (Till First Cross Road	Cum	1	40.00	7.00	0.04	11.20		
	8th A Cross Road (From First Cross Road	Cum	1	50.00	6.50	0.04	13.00		
	Last Cross Road LHS	Cum	1	55.00	5.50	0.04	12.10		
						Total Qty	123.16	10001.10	1231735.00
	Basic Rate (Issue Rates as on 02-11-2021	9435.00							
	Area Weightage @ 6%	566.10							
	Total	10001.10							

18	KSRRB M800-13.Road Marking with Hot Applied Thermoplastic Compound with Reflectrising Glass Beads on Bituminous Surface/ Concrete Surface: Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads at 250 gms per Sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 standards specified. The finished surface to be level, uniform and free from streaks and holes complete as per specifications. MORTH Specification No. 803(P.No-182,I No-24.15)								
	Road								
	5th Cross Road								
	1st Stretch	Sqm	2.50	55.00	0.10		13.75		
	2nd Stretch	Sqm	2.50	240.00	0.10		60.00		
	8th A Cross Road (From First Cross Road	Sqm	2.00	50.00	0.10		10.00		
	Last Cross Road LHS	Sqm	2.00	55.00	0.10		11.00		
						Total Qty	94.75	454.74	43087.00
	Basic Rate	429.00							
	Area Weightage @ 6%	25.74							
	Total	454.74							
	Sub-Total for CSR 2018-19								8753007.00
	Applicable GST Charges 12% on CSR 2018-19								1050361.00
	Detailed Project Reports (DPR) Charges 1%								98034.00
	Project Management and Quality Control (PMC) Charges 1%								98034.00
	Miscellaneous and unforeseen charges								564.00
	Grand Total Amount Rs.								10000000.00
(Rupees One Crore Only)									

CERTIFICATE

1) The site has been inspected and the work is found to be necessary.
2) The rates adopted are as per PW,P IWTD SR of 2018-19 and Approved Data Rate of Bangalore Circle.
3) The provisions were made in this estimate are necessary and adequate.
4) The area comes under the Bruhat Bengaluru Mahanagara Palike Limits.
5) This work is not repeated in any other Programs or Grants

Assistant Engineer
Ward No.08
B.B.M.P
JE-W8

Assistant Executive Engineer
Sub-Division
B.B.M.P
Assistant Executive Engineer
Kodigehalli Sub Division
BBMP, Bangalore

Executive Engineer
Byararayanapura - Division
B.B.M.P
ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು,
ಬ್ಯಾಟರಾಯನಪುರ ವಿಭಾಗ,
ಬೃ.ಬೆಂ.ಮ.ಪಾ. ಬೆಂಗಳೂರು.

SHRIYA CONSTRUCTION AND CONSULTANCY

Administrative Approval
Accorded For Rs 100 lakhs only
Head of A/C..................
CER NO :..44........ Dt:22.10.2021
TA CE (YNK)

Technical Sanction
Accorded For Rs 100 lakh only
Head of A/C..................
CER NO :..55....... Dt: 22/10/2021
TA CE

BRUHAT BANGALORE MAHANAGARA PALIKE

BYATARAYANAPURA DIVISION

SCHEDULE -B

NAME OF WORK : Improvements to Roads and drais in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli

	Job Code No :-		Est Cost: =100.00 Lakhs		
Sl. No.	Description of work	Unit	Quantity	Rate in Rs.	Amount in Rs.
1	KSRRB300-1. Earthwork excavation by manual means for roads, drains & similar works in ordinary soil excavated surface levelled and sides neatly dressed, the disposed earth to be levelled neatly after breaking of clods complete as per specifications.(I.NO 19.1,Page no 143 SR 2018-19)	CUM	952.44	215.28	205041.00
2	KSRB 4-12: Providing and laying Plain cement concrete 1:3:6 mix with OPC 220kgs with crushed stone aggregate 40 mm and down size graded granite metal coarse aggregates @0.892Cum and fine aggregates @ 0.465Cum machine mixed, machine mixed, concrete laid in layers not exceeding 15 cms. thick, well compacted, in foundation, including cost of all materials, labour, HOM curing complete as per specifications. Specification No. KBS 4.1, 4.2 (P.No-13,I No-4.2 of PWD BCSR 2018-19)	CUM	126.78	5989.25	759308.00
3	KSRB M2200-6 Providing T.M.T bars Fe 500 steel reinforcement for R.C.C work including straightening, cutting, bending, hooking, placing in position, lapping and / or welding wherever required, tying with binding wire and anchoring to the adjoining members wherever necessary complete as per design (laps, hooks and wastage shall not be measured and paid) cost of materials, labour, HOM of machinery complete as per specifications. MORTH Specification NO.1600&2200Specification No. Pg No.229 Item No.28.8.2	MT	15.81	90596.08	1432087.00
4	Providing laying plain/ reinforced cement concrete for side Drains Using M20 nominal mix Concrete with OPC at 300kgs.With 20mm and Down size granite metal coarse aggregate at 0.69Cum and fine aggregate at 0.43Cum Machne mixed, well compacted for wall and Bottom including centering shuttering,cost of materials,HOM of Machinery,Curing Etc.,Complete Excluding cost of Steel as per morth MORTH specification No. 1500, 1700, 2200. Including Cost of material, Labour, HOM complete as per Specification WALL & Bottom thickness 15Cm(Item No 37.59.2 page no 271)	CUM	280.91	7729.67	2171318.00
5	Providing and Fixing Pre cast covering Slab 100mm thick made out of CC, jelly 20mm Down size with steel reinforcement including form work,curing,including cost of alll materials, labour,hire charges of machinery, loading, unloading, lead and lift,transportation etc ,complete.As per Engineer incharge. (Data Rate)	SQM	679.01	2337.00	1586835.00
6	Supply and fixing Precast reinforced concrete slab 250cm thick including cost of reinforcement as per design and drawing, material cost, transportation, hire charges of machinery, machine cutting the vertical face to get plain even surface etc., complete with all leads and lift conveynce charges, labour charges inclusive of cost of all materials.	SQM	38.88	5418.00	210652.00
7	KSRB 4-1.6 ; Providing and laying in position plain cement concrete of Mix 1:2:4 with OPC @ 240kgs, with 20mm and down size graded granite metal coarse aggregates @ 0.878 Cum and fine aggregtes @ 0.53Cum, machine mixed, concrete laid in layers not exceeding 15 cms. thick, well compacted, in foundation, plinth and cills, including cost of all materials, labour, HOM curing complete as per specifications. Specification No. KBS 4.1, 4.2. (P.No-13,I No-4.6)	CUM	7.40	6274.89	46422.00

SHRIYA CONSTRUCTION AND CONSULTANCY

Sl. No.	Description of work	Unit	Quantity	Rate in Rs.	Amount in Rs.
8	Providing and fixing pre cast solid cement concrete kerb stones made out of CC 1:2:4 with top and bottom width 114 and 165 mm respectively, 400mm high and 450mm in length finished with CM 1:3 plastering and finishing cutting including formwork, curing, including cost of materials, labour charges of machinery, loading and unloading, lead and lift, transportation ete.,complete. As per the direction of Engineer incharge. (P.No.27, I.No.5.30 of PW, P&IWTD SR 2018-19)	NOS	822.00	432.48	355499.00
9	KSRRB 15-51.2 Providing and applying Painting in two coats with plastic emulsion paint of approved brand on wall surace to given an approved shade after throughly brushing the surfce, free from mortordrops and other foreign matter including preparing the surface even and sand paper smooth, cost of materials, labour complete as per specifications. with primer coat (Page No.119. litem no.15.51.2 of KPWD S.R Bangalore Circle 2018-2019)	SQM	129.47	95.40	12351.00
10	KSRRB M300-14. Excavation for roadwork in all types of soil by mechanical means including cutting and loading to tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transportation with a lead of 1.00 km and complete as per specifications MORTH Specificatio MORTH Specification No.301Loading and unloading (I No 19.14,P No-143) (8 km lead = 2*1.28X5)	Cum	188.25	63.94	12037.00
11	KSRRB 300-58. Compaction of original ground by mechanical means including filling in depression occuring during rolling including cost of all labour, HOM complete as per specifications.(I No-19.64,P No-147)	SQM	627.50	6.36	3991.00
12	KSRRB M400-17. Providing, laying, spreading and compacting cushed stone aggregates of granite / trap / basalt to wet mix macadam specifications including pre mixing the material with water at OMC in mechanical mix plant carriage of mixed materials by tipper to site, laying in uniform layers with paver in sub-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density complete as per specifications(P.No-155,I No-20.18)	CUM	94.13	2001.28	188370.00
13	Cleaning the existing black topped surface with brooms, soft brushes and finally dusting with old gunny bags and / or compressed air to receive bituminous treatment including cost of all materials, labour, HOM of machineries complete with all lead and lift as per the direction of engineer-in-charge	SQM	2725.00	5.30	14443.00
14	KSRRB M500-6. Providing and applying primer coat with S.S. bitumen emulsion on prepared surface of granular base such as WMM including cleaning of road surface and spraying primer at the rate of 0.60 kg / Sqm using mechanical means complete as per specifications Clause 502 of MORTH V revision(P.No-158,I No-21.6)	SQM	627.50	33.92	21285.00
15	KSRRB M500- 15. Providing, laying dense graded bituminous macadam using 40/60 TPH capacity H.M.P with Mechanical paver Gr-II (50mm to 75mm), crushed aggregates of specified grading premixed with 4.5% VG 30 grade bituminous binder and , transporting the hot mix to work site , laying to the required level and grade, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH table 500-10 complete in all respects complete as per specifications MORTH Specification No.507 (P.No.160 It.No.21.17.6)	CUM	49.08	8545.72	419381.00
16	KSRRB 500-7. Providing and applying tack coat using 80/100 grade bitumen(VG10) on the prepared black topped surfaces at 2.5 kg per 10 Sqm, heating bitumen in boiler fitted with spray set (excluding cleaning of road surface) including cost of all materials, labour, HOM complete as per specifications (P.No-161,I No-21.7)	SQM	3079.00	12.72	39165.00

SHRIYA CONSTRUCTION AND CONSULTANCY

Sl. No.	Description of work	Unit	Quantity	Rate in Rs.	Amount in Rs.
17	Providing and laying bituminous concrete 40 mm thick with hot mix plant, using crushed aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site, laying with a paver finisher to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 500.9 complete in all respects complete as per specifications. MORTH Specification No. 509 - using40/60 TPH capacity H.M.P. with Mechanical Paver Gr-II (30 mm to 45 mm) with 5.4 % VG-30 Bitumen (P.No-162 I No-21.22.6)	CUM	123.16	10001.10	1231735.00
18	KSRRB M800-13.Road Marking with Hot Applied Thermoplastic Compound with Reflectrising Glass Beads on Bituminous Surface/ Concrete Surface: Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads at 250 gms per Sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 standards specified. The finished surface to be level, uniform and free from streaks and holes complete as per specifications. MORTH Specification No. 803(P.No-182,I No-24.15)	SQM	94.75	454.74	43087.00
				Total Construction Cost	**8753007.00**

Contractor

Executive Engineer
ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು,
ಬ್ಯಾಟರಾಯನಪುರ ವಿಭಾಗ,
ಬೃ.ಬೆ.ಮ.ಪಾ. ಬೆಂಗಳೂರು.

SHRIYA CONSTRUCTION AND CONSULTANCY

BRUHAT BANGALORE MAHANAGARA PALIKE

NAME OF WORK : Improvements to Roads and drais in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli

DRAFT TENDER SCHEDULE

Sl. No.	Description of work	Unit	Quantity	Rate in Rs.	
				In Figures	In Words
1	KSRRB300-1. Earthwork excavation by manual means for roads, drains & similar works in ordinary soil excavated surface levelled and sides neatly dressed, the disposed earth to be levelled neatly after breaking of clods complete as per specifications.(I.NO 19.1,Page no 143 SR 2018-19)	CUM	952.44	215.28	
2	KSRB 4-12: Providing and laying Plain cement concrete 1:3:6 mix with OPC 220kgs with crushed stone aggregate 40 mm and down size graded granite metal coarse aggregates @0.892Cum and fine aggregates @ 0.465Cum machine mixed, machine mixed, concrete laid in layers not exceeding 15 cms. thick, well compacted, in foundation, including cost of all materials, labour, HOM curing complete as per specifications. Specification No. KBS 4.1, 4.2 (P.No-13,I No-4.2 of PWD BCSR 2018-19)	CUM	126.78	5989.25	
3	KSRB M2200-6 Providing T.M.T bars Fe 500 steel reinforcement for R.C.C work including straightening, cutting, bending, hooking, placing in position, lapping and / or welding wherever required, tying with binding wire and anchoring to the adjoining members wherever necessary complete as per design (laps, hooks and wastage shall not be measured and paid) cost of materials, labour, HOM of machinery complete as per specifications. MORTH Specification NO.1600&2200Specification No. Pg No.229 Item No.28.8.2	MT	15.81	90596.08	
4	Providing laying plain/ reinforced cement concrete for side Drains Using M20 nominal mix Concrete with OPC at 300kgs.With 20mm and Down size granite metal coarse aggregate at 0.69Cum and fine aggregate at 0.43Cum Machne mixed, well compacted for wall and Bottom including centering shuttering,cost of materials,HOM of Machinery,Curing Etc.,Complete Excluding cost of Steel as per morth MORTH specification No. 1500, 1700, 2200. Including Cost of material, Labour, HOM complete as per Specification WALL & Bottom thickness 15Cm(Item No 37.59.2 page no 271)	CUM	280.91	7729.67	
5	Providing and Fixing Pre cast covering Slab 100mm thick made out of CC, jelly 20mm Down size with steel reinforcement including form work,curing,including cost of alll materials, labour,hire charges of machinery, loading, unloading, lead and lift,transportation etc ,complete.As per Engineer incharge. (Data Rate)	SQM	679.01	2337.00	
6	Supply and fixing Precast reinforced concrete slab 250cm thick including cost of reinforcement as per design and drawing, material cost, transportation, hire charges of machinery, machine cutting the vertical face to get plain even surface etc., complete with all leads and lift conveynce charges, labour charges inclusive of cost of all materials.	SQM	38.88	5418.00	

EXECUTIVE ENGINEER BYATARAYANAPURA DIVISION

Sl. No.	Description of work	Unit	Quantity	Rate in Rs.	
				In Figures	In Words
7	KSRB 4-1.6 ; Providing and laying in position plain cement concrete of Mix 1:2:4 with OPC @ 240kgs, with 20mm and down size graded granite metal coarse aggregates @ 0.878 Cum and fine aggregtes @ 0.53Cum, machine mixed, concrete laid in layers not exceeding 15 cms. thick, well compacted, in foundation, plinth and cills, including cost of all materials, labour, HOM curing complete as per specifications. Specification No. KBS 4.1, 4.2. (P.No-13,I No-4.6)	CUM	7.40	6274.89	
8	Providing and fixing pre cast solid cement concrete kerb stones made out of CC 1:2:4 with top and bottom width 114 and 165 mm respectively, 400mm high and 450mm in length finished with CM 1:3 plastering and finishing cutting including formwork, curing, including cost of materials, labour charges of machinery, loading and unloading, lead and lift, transportation ete.,complete. As per the direction of Engineer incharge. (P.No.27, I.No.5.30 of PW, P&IWTD SR 2018-19)	NOS	822.00	432.48	
9	KSRRB 15-51.2 Providing and applying Painting in two coats with plastic emulsion paint of approved brand on wall surace to given an approved shade after throughly brushing the surfce, free from mortordrops and other foreign matter including preparing the surface even and sand paper smooth, cost of materials, labour complete as per specifications. with primer coat (Page No.119. Iitem no.15.51.2 of KPWD S.R Bangalore Circle 2018-2019)	SQM	129.47	95.40	
10	KSRRB M300-14. Excavation for roadwork in all types of soil by mechanical means including cutting and loading to tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transportation with a lead of 1.00 km and complete as per specifications MORTH Specificatio MORTH Specification No.301Loading and unloading (I No 19.14,P No-143) (8 km lead = 2*1.28X5)	Cum	188.25	63.94	
11	KSRRB 300-58. Compaction of original ground by mechanical means including filling in depression occuring during rolling including cost of all labour, HOM complete as per specifications.(I No-19.64,P No-147)	SQM	627.50	6.36	
12	KSRRB M400-17. Providing, laying, spreading and compacting cushed stone aggregates of granite / trap / basalt to wet mix macadam specifications including pre mixing the material with water at OMC in mechanical mix plant carriage of mixed materials by tipper to site, laying in uniform layers with paver in sub-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density complete as per specifications(P.No-155,I No-20.18)	CUM	94.13	2001.28	
13	Cleaning the existing black topped surface with brooms, soft brushes and finally dusting with old gunny bags and / or compressed air to receive bituminous treatment including cost of all materials, labour, HOM of machineries complete with all lead and lift as per the direction of engineer-in-charge	SQM	2725.00	5.30	

Sl. No.	Description of work	Unit	Quantity	Rate in Rs.	
				In Figures	In Words
14	KSRRB M500-6. Providing and applying primer coat with S.S. bitumen emulsion on prepared surface of granular base such as WMM including cleaning of road surface and spraying primer at the rate of 0.60 kg / Sqm using mechanical means complete as per specifications Clause 502 of MORTH V revision(P.No-158,I No-21.6)	SQM	627.50	33.92	
15	KSRRB M500- 15. Providing, laying dense graded bituminous macadam using 40/60 TPH capacity H.M.P with Mechanical paver Gr-II (50mm to 75mm), crushed aggregates of specified grading premixed with 4.5% VG 30 grade bituminous binder and , transporting the hot mix to work site , laying to the required level and grade, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH table 500-10 complete in all respects complete as per specifications MORTH Specification No.507 (P.No.160 It.No.21.17.6)	CUM	49.08	8545.72	
16	KSRRB 500-7. Providing and applying tack coat using 80/100 grade bitumen(VG10) on the prepared black topped surfaces at 2.5 kg per 10 Sqm, heating bitumen in boiler fitted with spray set (excluding cleaning of road surface) including cost of all materials, labour, HOM complete as per specifications (P.No-161,I No-21.7)	SQM	3079.00	12.72	
17	Providing and laying bituminous concrete 40 mm thick with hot mix plant, using crushed aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site, laying with a paver finisher to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 500.9 complete in all respects complete as per specifications. MORTH Specification No. 509 - using40/60 TPH capacity H.M.P. with Mechanical Paver Gr-II (30 mm to 45 mm) with 5.4 % VG-30 Bitumen (P.No-162 I No-21.22.6)	CUM	123.16	10001.10	
18	KSRRB M800-13.Road Marking with Hot Applied Thermoplastic Compound with Reflectrising Glass Beads on Bituminous Surface/ Concrete Surface: Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads at 250 gms per Sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 standards specified. The finished surface to be level, uniform and free from streaks and holes complete as per specifications. MORTH Specification No. 803(P.No-182,I No-24.15)	SQM	94.75	454.74	

"DTS APPROVED"

Executive Engineer

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು,
ಬ್ಯಾಟರಾಯನಪುರ ವಿಭಾಗ,

ಮುಖ್ಯ ಅಭಿಯಂತರರು
ಯೋಜನೆ ವಲಯ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

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ಕರ್ನಾಟಕ ಸರ್ಕಾರ
ಲೋಕೋಪಯೋಗಿ ಇಲಾಖೆ

ಅಧೀಕ್ಷಕ ಅಭಿಯಂತರರ ಕಚೇರಿ
ಲೋಕೋಪಯೋಗಿ ಇಲಾಖೆ
ಬೆಂಗಳೂರು ವೃತ್ತ, ಬೆಂಗಳೂರು

ಅಧೀಕ್ಷಕ ಅಭಿಯಂತರರು, ಲೋಕೋಪಯೋಗಿ ಇಲಾಖೆ, ಬೆಂಗಳೂರು ವೃತ್ತ, ಬೆಂಗಳೂರು ರವರ ಕಚೇರಿ ನಡಾವಳಿಗಳು

ವಿಷಯಃ 2018-19ನೇ ಸಾಲಿನ ಲೋಇ ಬೆಂಗಳೂರು ವೃತ್ತದ ದರಪಟ್ಟಿಯಲ್ಲಿ ಸಿಮೆಂಟ್, ಸ್ಟೀಲ್ ಮತ್ತು ಬಿಟುಮಿನ್ ಸಂಬಂಧಿತ ದರಗಳನ್ನು 2021-22 ನೇ ಸಾಲಿನ ಮೂರನೇ ತ್ರೈಮಾಸಿಕ ಅವಧಿಗೆ ಪರಿಷ್ಕರಿಸುವ ಬಗ್ಗೆ.

ಉಲ್ಲೇಖ
1. ಈ ಕಚೇರಿ ಆದೇಶ ಸಂಖ್ಯೆ : 3967 ದಿ. 01-01-2021
2. ಈ ಕಚೇರಿ ಆದೇಶ ಸಂಖ್ಯೆ : 4721 ದಿ. 01-02-2021
3. www.materialtree.com ರವರ ದರಗಳ ಪಟ್ಟಿ ದಿ. 02-11-2021
4. www.buildmadi.com ರವರ ದರಗಳ ಪಟ್ಟಿ ದಿ. 02-11-2021
5. MRPL ರವರ ದರಗಳ ಪಟ್ಟಿ ದಿ. 01-11-2021

ಪ್ರಸ್ತಾವನೆ:

2018-19ನೇ ಸಾಲಿನ ಲೋಕೋಪಯೋಗಿ ಇಲಾಖೆ, ಬೆಂಗಳೂರು ದರಪಟ್ಟಿಯಲ್ಲಿನ ಸಾಮಾನ್ಯ ಟಿಪ್ಪಣಿ ಸಂಖ್ಯೆ : 4 ರ ಪ್ರಕಾರ ಸಿಮೆಂಟ್, ಸ್ಟೀಲ್ ಮತ್ತು ಬಿಟುಮಿನ್‌ಗಳ ಪರಿಷ್ಕೃತ ದರವನ್ನು ಕೆಳಕಂಡ ಸನ್ನಿವೇಶದಲ್ಲಿ ಹೊರಡಿಸಬೇಕಾಗಿರುತ್ತದೆ.

"The prevailing market rates of cement, steel & bitumen will be assessed and the bare rates will be approved by the Superintending Engineer & published quarterly i.e., 1st April, 1st July, 1st October & 1st January whenever the variation in price is more/less than 10% over the previously approved rates"

ಉಲ್ಲೇಖ-(1)ರಲ್ಲಿ 2018-19ನೇ ಸಾಲಿನ ಬೆಂಗಳೂರು ವೃತ್ತದ ದರಪಟ್ಟಿಯಲ್ಲಿ 2020-21ನೇ ಸಾಲಿನ ನಾಲ್ಕನೇ ಅವಧಿಗೆ ಅನ್ವಯಿಸುವಂತೆ ಸಿಮೆಂಟ್, ಸ್ಟೀಲ್ ಮತ್ತು ಬಿಟುಮಿನ್‌ಗಳ ದರಗಳನ್ನು ಪರಿಷ್ಕರಿಸಲಾಗಿರುತ್ತದೆ. ಉಲ್ಲೇಖ (3) ಮತ್ತು (4)ರಲ್ಲಿ ಸಿಮೆಂಟ್ ಮತ್ತು ಸ್ಟೀಲ್ ದರಗಳನ್ನು ಪಡೆದು ದಿನಾಂಕ 01-01-2021ರ ಮತ್ತು 01-02-2021ರ ದರಗಳಿಗೆ ತುಲನೆ ಮಾಡಲಾಗಿ ನಿಗಧಿತ ಬದಲಾವಣೆ ಕಂಡು ಬಂದಿರುವ ಹಿನ್ನೆಲೆಯಲ್ಲಿ, ಸದರಿ ದರಗಳನ್ನು ಪರಿಷ್ಕರಿಸಬೇಕಿರುತ್ತದೆ. ಉಲ್ಲೇಖ-(5)ರಲ್ಲಿ ಎಂಆರ್‌ಪಿಎಲ್ ರವರ ದರಗಳನ್ನು ದಿನಾಂಕ 01-01-2021ರ ಬಿಟುಮಿನ್ ಸಂಬಂಧಿತ ದರಗಳಿಗೆ ತುಲನೆ ಮಾಡಲಾಗಿ ನಿಗಧಿಪಡಿಸಲಾಗಿರುವ ದರಗಳಿಗಿಂತ ಶೇ.10 ಕ್ಕಿಂತ ಹೆಚ್ಚು/ಕಡಿಮೆ ಇರುವುದು ಕಂಡುಬಂದ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ಪರಿಷ್ಕರಿಸಬೇಕಿರುತ್ತದೆ.

SEBC

2. ಸರ್ಕಾರದ ಕಾರ್ಯದರ್ಶಿಗಳು, ಜಲಸಂಪನ್ಮೂಲ ಇಲಾಖೆ, ವಿಕಾಸ ಸೌಧ, ಬೆಂಗಳೂರು ರವರ ಘನ ಮಾಹಿತಿಗಾಗಿ ಸಲ್ಲಿಸಿದೆ.
3. ಸರ್ಕಾರದ ಕಾರ್ಯದರ್ಶಿಗಳು, ಸಣ್ಣ ನೀರಾವರಿ ಇಲಾಖೆ, ವಿಕಾಸ ಸೌಧ, ಬೆಂಗಳೂರು ರವರ ಘನ ಮಾಹಿತಿಗಾಗಿ ಸಲ್ಲಿಸಿದೆ
4. ಸರ್ಕಾರದ ಕಾರ್ಯದರ್ಶಿಗಳು, ಪಂಚಾಯತ್ ಇಂಜಿನಿಯರಿಂಗ್ ಇಲಾಖೆ, ಬೆಂಗಳೂರು ರವರ ಘನ ಮಾಹಿತಿಗಾಗಿ ಸಲ್ಲಿಸಿದೆ.
5. ಪ್ರಧಾನ ಅಭಿಯಂತರರು, ಪ್ರಾಂಸಿ, ಬೆಂಗಳೂರು ರವರ ಘನ ಮಾಹಿತಿಗೆ ಸಲ್ಲಿಸುತ್ತಾ,ಇಲಾಖಾ ವೆಬ್‌ಸೈಟ್‌ನಲ್ಲಿ ಅಪ್‌ಲೋಡ್ ಮಾಡಲು ಕೋರಿದೆ.
6. ಮುಖ್ಯ ಅಭಿಯಂತರರು, ಸಂಪರ್ಕ ಮತ್ತು ಕಟ್ಟಡಗಳು (ದ) ಬೆಂಗಳೂರು ರವರ ಘನ ಮಾಹಿತಿಗೆ ಸಲ್ಲಿಸಿದೆ.
7. ನಿರ್ದೇಶಕರು, ಇ-ಪ್ರೊಕ್ಯೂರ್‌ಮೆಂಟ್, ಬಹುಮಹಡಿಗಳ ಕಟ್ಟಡ, ಬೆಂಗಳೂರು ರವರ ಘನ ಮಾಹಿತಿಗೆ ಸಲ್ಲಿಸುತ್ತಾ, ಇ-ಪ್ರೋಕ್ ಪೋರ್ಟಲ್‌ನಲ್ಲಿ ಸದರಿ ದರಗಳನ್ನು ಅಪ್‌ಲೋಡ್ ಮಾಡಲು ಕೋರಿದೆ.
8. ಮುಖ್ಯ ಅಭಿಯಂತರರು, ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ, ಬೆಂಗಳೂರು ರವರ ಘನ ಮಾಹಿತಿಗೆ ಸಲ್ಲಿಸಿದೆ.
9. ಮುಖ್ಯ ಅಭಿಯಂತರರು, ಬೆಂಗಳೂರು ಅಭಿವೃದ್ಧಿ ಪ್ರಾಧಿಕಾರ, ಬೆಂಗಳೂರು ರವರ ಘನ ಮಾಹಿತಿಗೆ ಸಲ್ಲಿಸಿದೆ.
10. ಅಧೀಕ್ಷಕ ಅಭಿಯಂತರರು, ಲೋಇ ವೃತ್ತ, ಮೈಸೂರು, ಹಾಸನ, ಮಂಗಳೂರು, ಬಳ್ಳಾರಿ, ಕಲ್ಬುರ್ಗಿ, ಬೆಳಗಾವಿ, ಧಾರವಾಡ ಮತ್ತು ಶಿವಮೊಗ್ಗ ರವರುಗಳ ಮಾಹಿತಿಗಾಗಿ ಇ-ಮೇಲ್ ಮುಖಾಂತರ ಕಳುಹಿಸಿದೆ.
11. ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು, ಲೋಇ ವಿಭಾಗ, ಬೆಂಗಳೂರು, ರಾಮನಗರ, ಕೋಲಾರ, ತುಮಕೂರು, ಮಧುಗಿರಿ ಮತ್ತು ಚಿಕ್ಕಬಳ್ಳಾಪುರ ರವರುಗಳ ಮಾಹಿತಿಗಾಗಿ ಹಾಗೂ ತಮ್ಮ ವ್ಯಾಪ್ತಿಯ ಎಲ್ಲಾ ಉಪ ವಿಭಾಗಗಳಿಗೂ ಪ್ರತಿಯನ್ನು ರವಾನಿಸಲು ಸೂಚಿಸಿದೆ.

ಅಧೀಕ್ಷಕ ಅಭಿಯಂತರರು
ಲೋಇ ಬೆಂಗಳೂರು ವೃತ್ತ

26	21.20.8	m^3	7893	6989	6989	6989	6989	6989	6989	6989
27	21.20.9	m^3	7228	6414	6414	6414	6414	6414	6414	6414
28	21.20.10	m^3	7758	6854	6854	6854	6854	6854	6854	6854
29	21.20.11	m^3	7376	6562	6562	6562	6562	6562	6562	6562
30	21.20.12	m^3	7713	6809	6809	6809	6809	6809	6809	6809
31	21.21.1	m^3	7595	6862	7347	6698	5958	6536	7321	8385
32	21.21.2	m^3	8151	7337	7875	7154	6332	6975	7847	9028
33	21.21.3	m^3	7462	6729	7214	6565	5825	6403	7188	8252
34	21.21.4	m^3	8015	7201	7740	7019	6197	6839	7711	8893
35	21.21.5	m^3	7416	6684	7168	6519	5779	6358	7143	8206
36	21.21.6	m^3	7970	7156	7695	6974	6152	6794	7666	8848
37	21.22.1	m^3	8367	7410	8043	7121	6154	6910	7892	9283
38	21.22.2	m^3	8656	7648	8315	7345	6327	7123	8156	9619
39	21.22.3	m^3	8230	7272	7906	6983	6016	6773	7755	9146
40	21.22.4	m^3	8518	7510	8177	7207	6189	6985	8017	9481
41	21.22.5	m^3	8184	7226	7860	6937	5970	6727	7708	9100
42	21.22.6	m^3	8472	7464	8131	7161	6143	6939	7972	9435
43	21.23.1	m^3	8525	7663	8234	7470	6599	7280	8203	9455
44	21.23.2	m^3	8822	7915	8515	7711	6795	7511	8483	9799
45	21.23.3	m^3	8389	7527	8098	7334	6463	7144	8067	9319
46	21.23.4	m^3	8685	7778	8378	7575	6659	7375	8346	9663
47	21.23.5	m^3	8343	7481	8052	7288	6417	7098	8021	9273
48	21.23.6	m^3	8639	7732	8332	7529	6613	7329	8300	9617
49	21.26	m^2	95	86	86	86	86	86	86	86
50	21.27	m^2	77	69	69	69	69	69	69	69
51	21.32	m^2	139	127	127	127	127	127	127	127
52	21.33	m^2	142	132	139	130	120	128	139	154
53	21.36	m^2	155	138	150	133	116	130	147	172
54	21.37	m^2	158	143	153	139	124	136	153	175
55	21.38	m^2	144	129	139	124	110	121	137	159
56	21.39	m^2	146	133	142	130	117	127	142	161
57	21.40	m^2	171	154	165	149	132	145	163	188
58	21.41	m^2	174	158	169	155	140	152	168	191

92	21.78.1	m^3	8120	7240	7240	7240	7240	7240	7240	7240
93	21.78.2	m^3	8395	7468	7468	7468	7468	7468	7468	7468
94	21.78.3	m^3	7675	6794	6794	6794	6794	6794	6794	6794
95	21.78.4	m^3	8257	7330	7330	7330	7330	7330	7330	7330
96	21.78.5	m^3	7826	6945	6945	6945	6945	6945	6945	6945
97	21.78.6	m^3	8408	7481	7481	7481	7481	7481	7481	7481
98	21.78.7	m^3	8228	7348	7930	7082	6192	6889	7791	7791
99	21.78.8	m^3	8509	7582	8195	7302	6365	7098	8048	9395
100	21.78.9	m^3	7783	6902	7485	6637	5747	6443	7346	8625
101	21.78.10	m^3	8370	7443	8057	7164	6227	6960	7910	9257
102	21.78.11	m^3	7933	7053	7635	6788	5898	6594	7497	8776
103	21.78.12	m^3	8521	7594	8207	7315	6379	7111	8061	9408
104	21.79.1	m^3	10298	9230	9937	8908	7830	8673	9768	11320
105	21.79.2	m^3	10310	9242	9949	8920	7841	8685	9780	11332
106	35.4	m^2	193	175	175	175	175	175	175	175
107	35.5	m^2	345	307	308	306	306	306	308	308
108	35.13.1	m^2	333	313	324	308	291	304	322	347
109	35.13.2	m^2	426	406	417	400	384	397	415	440
110	35.14.1	m^2	185	166	177	161	144	157	174	200
111	35.14.2	m^2	196	171	186	164	142	160	183	216
112	35.14.3	m^2	372	330	356	318	278	309	350	409
113	35.14.4	m^2	560	497	537	479	418	466	528	616
114	38.39.1	Unit	33005	32150	32687	31943	31162	31866	32617	33809
115	38.39.2	Unit	39017	37690	38529	37345	36104	37167	38387	40241
116	38.39.3	Unit	50370	48603	49711	48135	46483	47868	49504	51949
117	38.40.1	Unit	36376	35097	35914	34762	33554	34592	35778	37585
118	38.40.2	Unit	40385	38841	39823	38431	36971	38205	39467	41815
119	38.40.3	Unit	52191	50134	51433	49580	47636	49249	51182	54046
120	38.41.1.1	Unit	18580	17960	18363	17814	17239	17782	18325	19221
121	38.41.1.2	Unit	18132	17519	17917	17376	16809	17346	17881	18765
122	38.41.1.3	Unit	22847	21982	22533	21769	20968	21688	22460	23681
123	38.41.2.1	Unit	26422	25387	26043	25126	24164	25010	25945	27396
124	38.41.2.2	Unit	21948	20926	21558	20657	19712	20498	21437	22831

ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

ಟಿಪ್ಪಣಿ ಹಾಳೆ

ವಿಷಯ R.C.C. Pre-Cast Covering Slab ದಾಸ್ತಾನು ಪುಟದ ಸಂಖ್ಯೆ -1-

ಕಡತದ ಸಂಖ್ಯೆ

ಪಂಕ್ತಿಯ ಸಂಖ್ಯೆ	ಟಿಪ್ಪಣಿಗಳು ಮತ್ತು ಆಜ್ಞೆಗಳು
-01-	ಮಂಡಿಸಿದೆ. ವಿಷಯ:- ಆರ್.ಸಿ.ಸಿ ಪ್ರಿ ಕ್ಯಾಸ್ಟ್ ಕವರಿಂಗ್ ಸ್ಲಾಬ್ 10.00 ಎಂ.ಎಂ. ಹಾಗೂ 250.00 ಎಂ.ಎಂ ಅಳವಡಿಸಲು ದರ ಅನುಮೋದನೆ ಪಡೆಯುವ ಬಗ್ಗೆ. ಮೇಲ್ಕಂಡ ವಿಷಯಕ್ಕೆ ಸಂಬಂದಿಸಿದಂತೆ, ವಾರ್ಡ್ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಪಾಲಿಕೆ ವತಿಯಿಂದ ಅಭಿವೃದ್ಧಿ ಕಾಮಗಾರಿಗಳನ್ನು ನಿರ್ವಹಿಸುತ್ತಿದ್ದು, ಕಾಂಕ್ರಿಟ್ ಚರಂಡಿಗಳನ್ನು ನಿರ್ಮಿಸುವ ಸಂಧರ್ಭದಲ್ಲಿ ಕಾಂಕ್ರಿಟ್ ಚರಂಡಿಗಳಿಗೆ ಮೊದಲೇ ಅಚ್ಚು (Pre Cast) ಅಚ್ಚು ಹಾಕಿದ ಆರ್.ಸಿ.ಸಿ ಪ್ರಿ ಕ್ಯಾಸ್ಟ್ ಕವರಿಂಗ್ ಸ್ಲಾಬ್ ಅಳವಡಿಸುವುದು ಅತ್ಯವಶ್ಯಕವಾಗಿರುತ್ತದೆ. ಚರಂಡಿಗಳ ಮೇಲೆ ಆರ್.ಸಿ.ಸಿ ಕವರಿಂಗ್ ಸ್ಲಾಬ್ ಅಳವಡಿಸುವ ಕಾಮಗಾರಿಯನ್ನು ನಿರ್ವಹಿಸಲು ಲೋಕೋಪಯೋಗಿ ಇಲಾಖೆ ಬೆಂಗಳೂರು ವೃತ್ತ ರವರ 2018-19 ನೇ ಸಾಲಿನ ದರಪಟ್ಟಿಯಲ್ಲಿ ದರಗಳಿಲ್ಲದ ಕಾರಣ ಲೋಕೋಪಯೋಗಿ ಇಲಾಖೆಯ 2018-19 ನೇ ಸಾಲಿನ ಉಕ್ಕಿನ ದರ, ಸೆಟಂರಿಂಗ್ ದರ ಹಾಗೂ ಸಿಮೆಂಟ್ ಕಾಂಕ್ರಿಟ್ ಎಂ-20 ದರಗಳನ್ನು ಒಳಗೊಂಡತೆ ದರಗಳನ್ನು ಪಡೆದುಕೊಂಡು (ದರ ಪಟ್ಟಿಯನ್ನು ಲಗತ್ತಿಸಿದೆ) ಕ್ರೋಡಿಕರಿಸಿ ಒಂದು ಚದರು ಮೀಟರ್ 10.00 ಎಂ.ಎಂ ಆರ್.ಸಿ.ಸಿ ಕವರಿಂಗ್ ಸ್ಲಾಬ್ ಗೆ ರೂ. 2337.00 ಹಾಗೂ ಒಂದು ಚದರು ಮೀಟರ್ 250.00 ಎಂ.ಎಂ ಆರ್.ಸಿ.ಸಿ ಕವರಿಂಗ್ ಸ್ಲಾಬ್ ಗೆ ರೂ. 5418.00 ವೆಚ್ಚ ವಾಗುವುದರಿಂದ ಸದರಿ ದರವನ್ನು ಅನುಮೋದಿಸಲು ಕೋರಿ ಕಡತವನ್ನು ಮುಂದಿನ ಕ್ರಮಕ್ಕಾಗಿ ಮಂಡಿಸಿದೆ. ಸಹಾಯಕ ಅಭಿಯಂತರರು, ವಾರ್ಡ್ ನಂ.40 ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು, ಹೇರೋಹಳ್ಳಿ ಉಪ ವಿಭಾಗ, ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
-02-	ಕಾ.ಅ (ಕೆಂಗೇರಿ ವಿಭಾಗ) ಕಂಡಿಕೆ(01) ರ ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು (ಹೇ) ರವರ ವರದಿಯಂತೆ ಕಾಂಕ್ರಿಟ್ ಚರಂಡಿಗಳನ್ನು ನಿರ್ಮಿಸುವ ಸಂಧರ್ಭದಲ್ಲಿ ಕಾಂಕ್ರಿಟ್ ಚರಂಡಿಗಳಿಗೆ ಮೊದಲೇ ಅಚ್ಚು (Pre Cast) ಅಚ್ಚು ಹಾಕಿದ ಆರ್.ಸಿ.ಸಿ ಪ್ರಿ ಕ್ಯಾಸ್ಟ್ ಕವರಿಂಗ್ ಸ್ಲಾಬ್ ಅಳವಡಿಸಬೇಕಾಗಿರುವುದರಿಂದ ಲೋಕೋಪಯೋಗಿ ಇಲಾಖೆ ಬೆಂಗಳೂರು ವೃತ್ತ ರವರ 2018-19 ನೇ ಸಾಲಿನ ದರಪಟ್ಟಿಯಲ್ಲಿ ದರಗಳಿಲ್ಲದ ಕಾರಣ ಲೋಕೋಪಯೋಗಿ ಇಲಾಖೆಯ 2018-19 ನೇ ಸಾಲಿನ ಉಕ್ಕಿನ ದರ, ಸೆಟಂರಿಂಗ್ ದರ ಹಾಗೂ ಸಿಮೆಂಟ್ ಕಾಂಕ್ರಿಟ್ ಎಂ-20 ದರಗಳನ್ನು ಒಳಗೊಂಡತೆ ದರಗಳನ್ನು ಪಡೆದುಕೊಂಡು (ದರ ಪಟ್ಟಿಯನ್ನು ಲಗತ್ತಿಸಿದೆ) ಕ್ರೋಡಿಕರಿಸಿ ಒಂದು ಚದರು ಮೀಟರ್ 10.00 ಎಂ.ಎಂ ಆರ್.ಸಿ.ಸಿ ಕವರಿಂಗ್ ಸ್ಲಾಬ್ ಗೆ ರೂ. 2337.00 ಹಾಗೂ ಒಂದು ಚದರು ಮೀಟರ್ 250.00 ಎಂ.ಎಂ ಆರ್.ಸಿ.ಸಿ ಕವರಿಂಗ್ ಸ್ಲಾಬ್ ಗೆ ರೂ. 5418.00 ವೆಚ್ಚವಾಗುವುದರಿಂದ ಸದರಿ ದರವನ್ನು ಅನುಮೋದಿಸಲು ಕೋರಿ ಕಡತವನ್ನು ಮಂಡಿಸಿದೆ. ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು ಕೆಂಗೇರಿ ವಿಭಾಗ ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
-03-	
-04-	ಮುಖ್ಯ ಅಭಿಯಂತರರು (ರಾರಾನವ)

ಪು.ತಿ.ನೋ

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Data Rates

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	Rate Analysis								
	Basic Rate in Rs.			358.00					
	Add 6% Area Weigtage			21.48					
	Total Rate in Rs.			**379.48**					
	Deduct 25% of Verticle Strating			**94.87**					
	Grand Total			**284.61**					
			2	2.00	0.10		0.40		
			2	0.60	0.10		0.12		
							0.52	284.61	148.00
5	KSRB 4.9.2 : Providing **T.M.T steel reinforcement for R.C.C work** including straightening, cutting, bending, hooking, placing in position, lapping and / or welding wherever required, tying with binding wire and anchoring to the adjoining members wherever necessary complete as per design (laps, hooks and wastage shall not be measured and paid) cost of materials, labour, HOM complete as per specifications. Specification No. KBS 4.6.3 TMT bars Fe 500								
	Tonne								
	(Page No 18,I.No.4.46.2 of KPWD S.R 2018-19).								
	Rate Analysis								
	Basic Rate in Rs.			70966.00					
	Add 6% Area Weigtage			4257.96					
	Total Rate in Rs.			**75223.96**					
	12mm dia@150mm c/c	0.89kg/cum	7	2.00			14.00		
	10mm dia@150mm c/c	0.62kg/cum	15	0.60			9.00		
							0.01		
							0.01		
							0.02	75223.96	1357.04
6	0282 P.V.C pipes unplasticised 32mm								
	Per Rmtr								
	(Page No XXVI,Sl.No.674 of KPWD S.R 2018-19).								
	Rate Analysis								
	Basic Rate in Rs.			55.08					
	Total Rate in Rs.			**55.08**					
	pipe for weep hole		8	0.10			0.80		
							0.80	55.08	44.06
7	KSRB15-6 : Providing floating coat of cement to plastering and finishing smooth, including cost of materials, labour, curing complete as per specifications.								
	Sqm								
	(Page No 118,I.No.15.32 of KPWD S.R 2018-19).								
	Rate Analysis								
	Basic Rate in Rs.			19.00					
	Add 6% Area Weigtage			1.14					
	Total Rate in Rs.			**20.14**					
			2	2.00	0.60		2.40		
			2	2.00		0.10	0.40		
			2	0.60		0.10	0.12		
							2.92	20.14	58.81
				Total					2804.23

Therefore cost for Per Sqm= Total/(2*0.6) $\frac{2804.23}{(2.0*0.6)}$ 2336.86

Say 2337.00 - 100 mm

Asst Engineer
Ward No.40

Asst Executive Engineer
Herohalli Sub-Division

Executive Engineer
Kengeri Division

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4	KSRB 4.9.2 : Providing **T.M.T steel reinforcement for R.C.C work** including straightening, cutting, bending, hooking, placing in position, lapping and / or welding wherever required, tying with binding wire and anchoring to the adjoining members wherever necessary complete as per design (laps, hooks and wastage shall not be measured and paid) cost of materials, labour, HOM complete as per specifications. Specification No. KBS 4.6.3 TMT bars Fe 500									
	Tonne									
	(Page No 18,I.No.4.46.2 of KPWD S.R 2018-19).									
	Rate Analysis									
	Basic Rate in Rs.			70966.00						
	Add 6% Area Weigtage			4257.96						
	Total Rate in Rs.			75223.96						
	Steel 16mm dia Main rod @150mm c/c	1.58kg/cum	2	5.00	2.20		22.00			
	Lifting Hook 10mm dia - 2 Nos	0.62kg/cum	1	2.00	0.30		0.60			
							22.60			
	Steel 8mm dia - Main rod @150mm c/c	0.40kg/cum	2	13.00	0.60		0.04 15.60			
							0.01			
5	Refixing of Precast slabs of drains and pointing in C.M (1:3)						0.04	75223.96		3155.49
	Sqm									
	Rate Analysis									
a	**Removing & Refixing stone slabs of drains**			105.00						
b	**Removing B.S. slab of Drain and stacking. (**			99.00						
	Arrived Rate (a-b)			6.00						
	Add 6% Area Weigtage			0.36						
	Total Rate in Rs.			6.36						
			1	1.80	0.60		1.08			
	Total						1.08	6.36		6.87
										5851.53

Therefore cost for Per Sqm= Total/(1.8*0.6) $\frac{5851.53}{(1.8*0.6)}$ 5418.08

Say 5418.00 - 250 mm.

Asst Engineer
Ward No.40

Asst Executive Engineer
Herohalli Sub-Division

Executive Engineer
Kengeri Division

"DATA RATE HERE BY APPROVED"

ಮುಖ್ಯ ಅಧಿಯಂತರರು.
ರಾಜರಾಜೇಶ್ವರಿ ನಗರ ವಲಯ
ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ.

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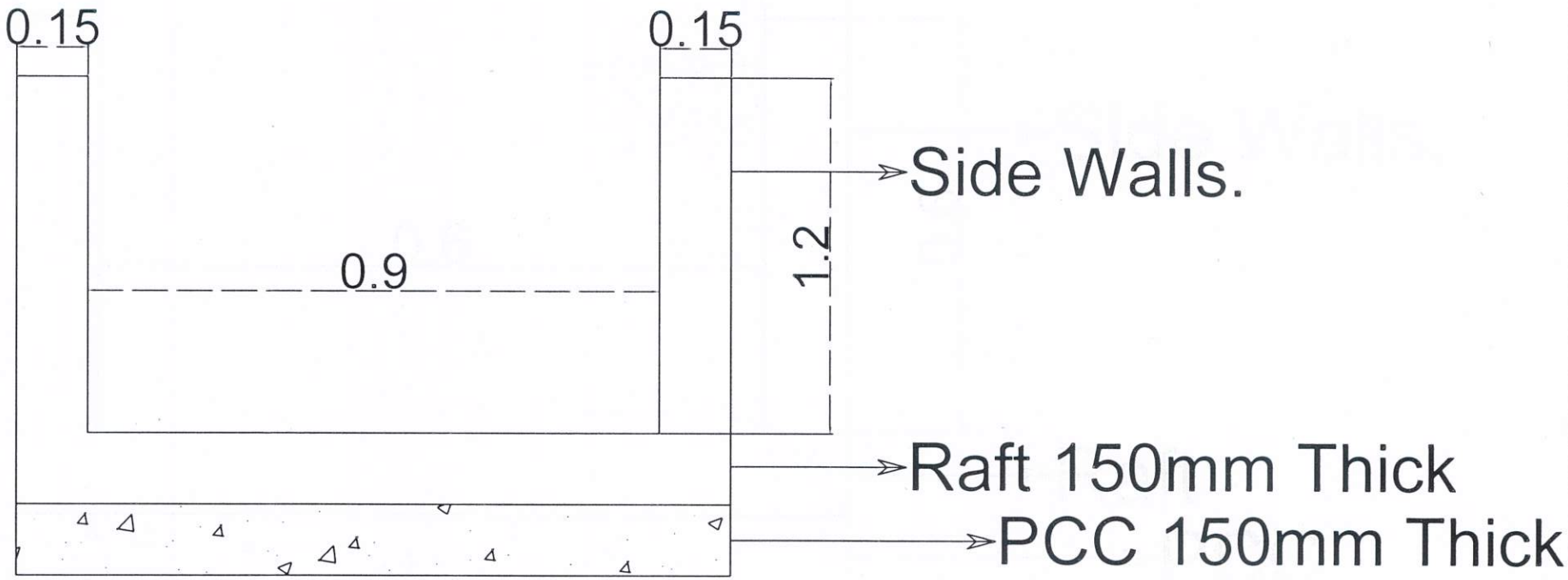
DRAWINGS AND SKETCHES

NAME OF WORK : Improvements to Roads and drais in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli



Assistant Executive Engineer
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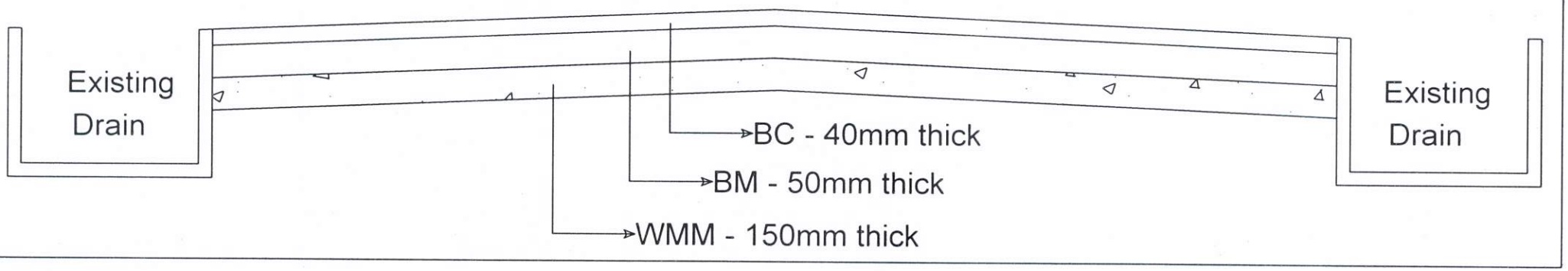
BBMP, Bangalore

SHRIYA CONSTRUCTION AND CONSULTANCY

TATA NAGARA 11th Main Road

NAME OF WORK : Improvements to Roads and drais in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli



SHRIYA CONSTRUCTION AND CONSULTANCY

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Kodigehalli Sub Division
BBMP, Bangalore

KEY MAPS

NAME OF WORK : Improvements to Roads and drais in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli
5TH Cross Road
11th Main Road
2nd Cross Rd
1st Cross Rd
8th A Main Rd
8th Main Rd
7th Main Rd
6th Main Rd
5th Main Rd
6th Cross Rd
7th Cross Rd
9th Main Rd
4th Cross Rd
5th cross Rd
4th Main Rd
3rd Main Rd
2nd Main Rd
1st Main Rd
Kodigehalli Main Rd
9th Cross Rd
Strivita Technologies
SMart Needs Super Mart
Delivery
kidzee tatanagar centre
Simply Fresh, Tatanagar
AAR VEE Solar Systems
jalageramma temple
JRD Tata Nagar Sports Club And Park
Sub Registrar Offic Byatarayanapura
Civil lab and Geotech consult
Neokraft Medical Pvt
ROTI MANE
Takeout
GIFTS EZ
Vedha
AB Plastomech Pvt
Family Enclave association
Tatanagar playground
Motoshaft
Bank of Baroda (E Dena)
Shreemataa
Doddabommasandra Gated Railway Crossing
Vailankanni Packaging Private Limited
Garden makers and all garden solutions
Plant nursery
BGN Condiments
Takeout
Sri Ranganatha Credit Co Op Society
SBM Toilet
BFC Bengaluru Fitness Club
Mafco Distributors
Satish Dhawan Park
Deekhitha Auto Electrical & Battery Shop
Car battery store
RoyalMart Supermarket
Delivery
Amar Aromatic
Indian Overseas Bank
Udupi Vaibhav Veg
Takeout · Delivery
Glen Gate, House Of Hiranandani
Car Spa
Ramesh Tours And Travels, Hebbal
Arcturus Inc
UIDAI Technology Center
UIDAI
UIDAI Aadhaar Data Centre
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ASPHALT ROAD
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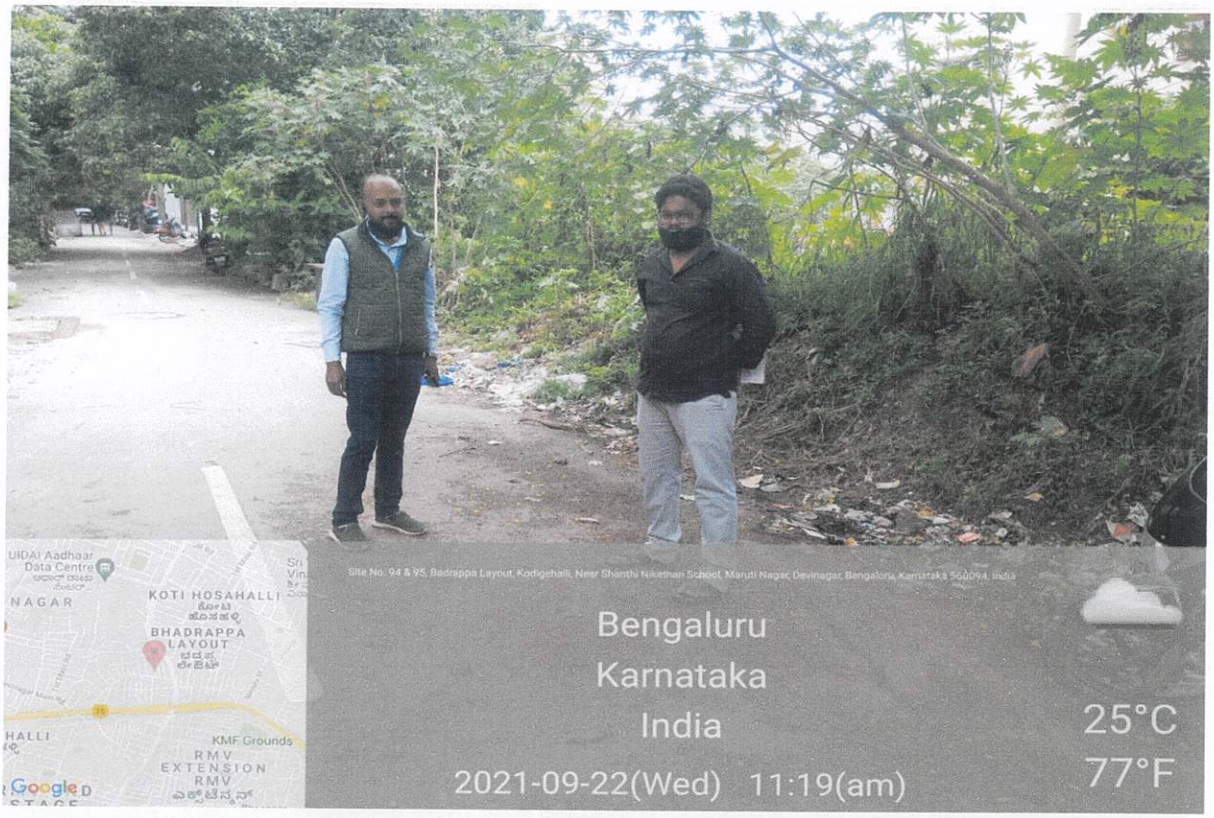
EXISTING PHOTOS

NAME OF WORK : Improvements to Roads and drains in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli



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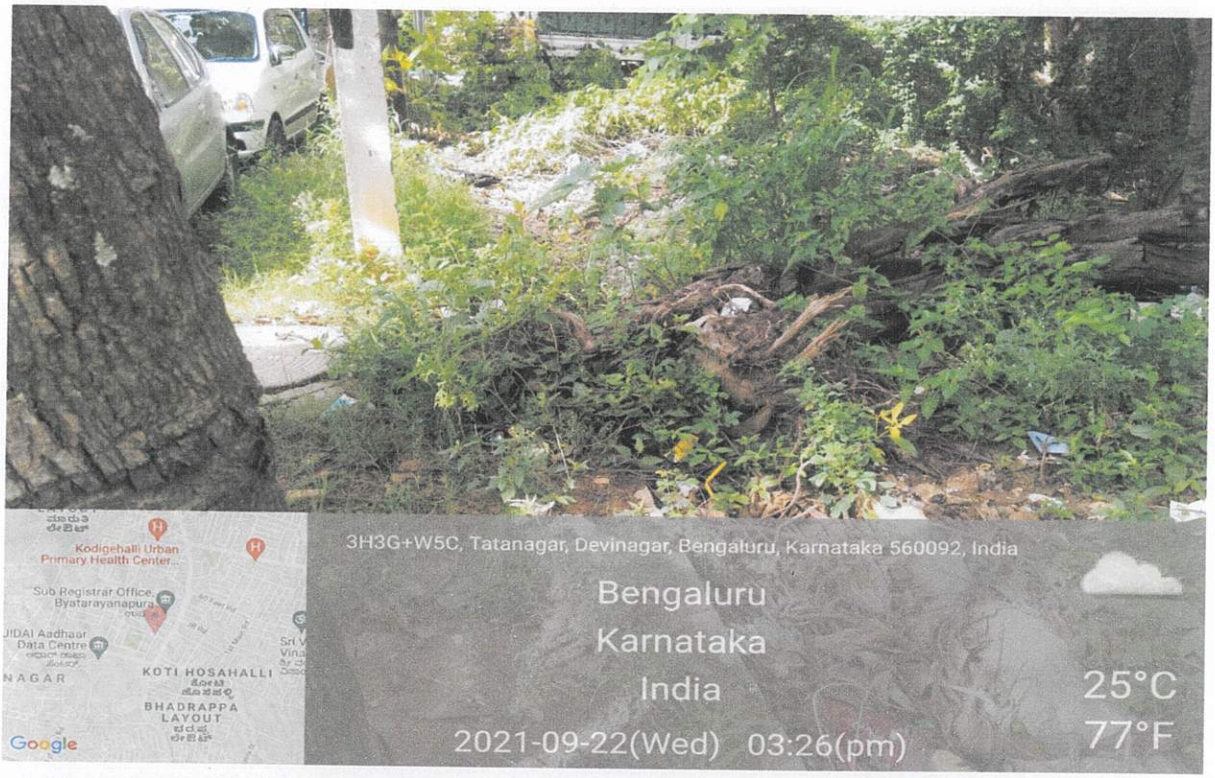

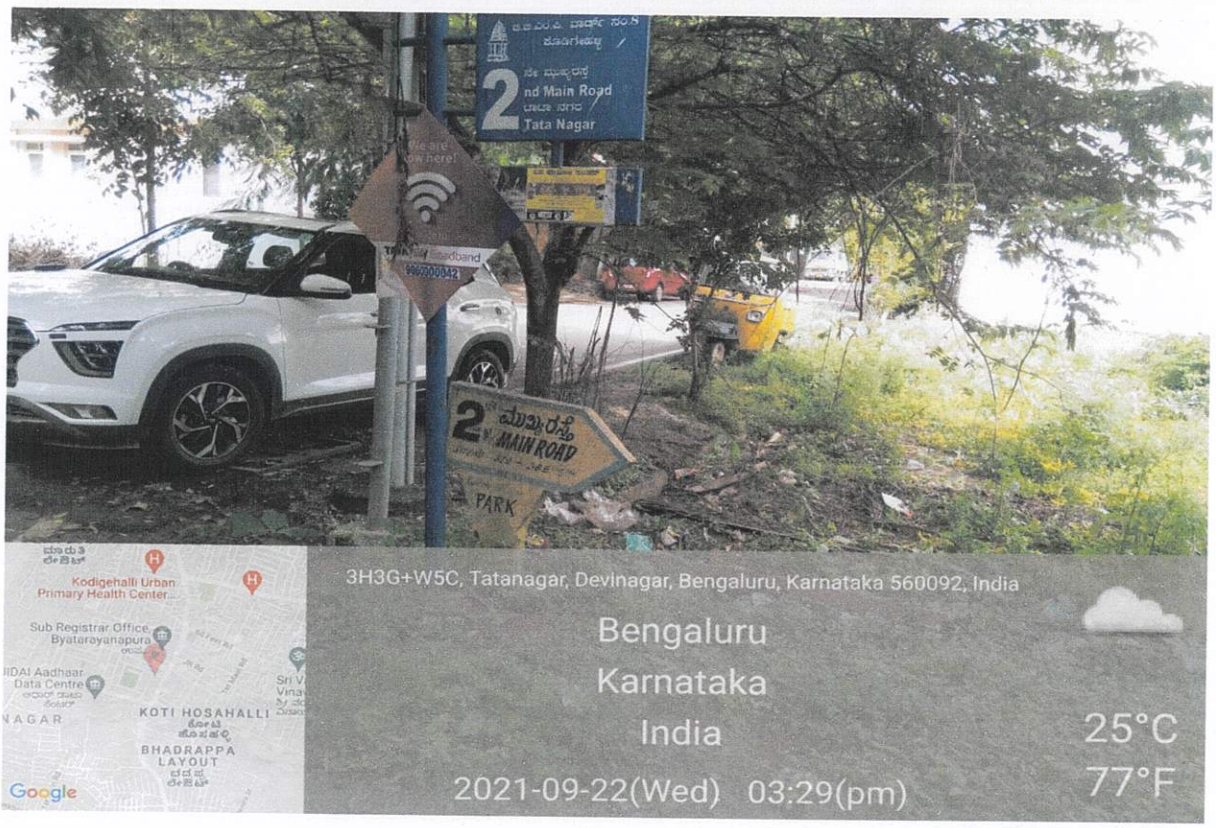

Assistant Executive Engineer
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SHIVA CONSTRUCTION AND CONSULTANCY

NAME OF WORK : Improvements to Roads and drains in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli

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SHRIYA CONSTRUCTION AND CONSULTANCY

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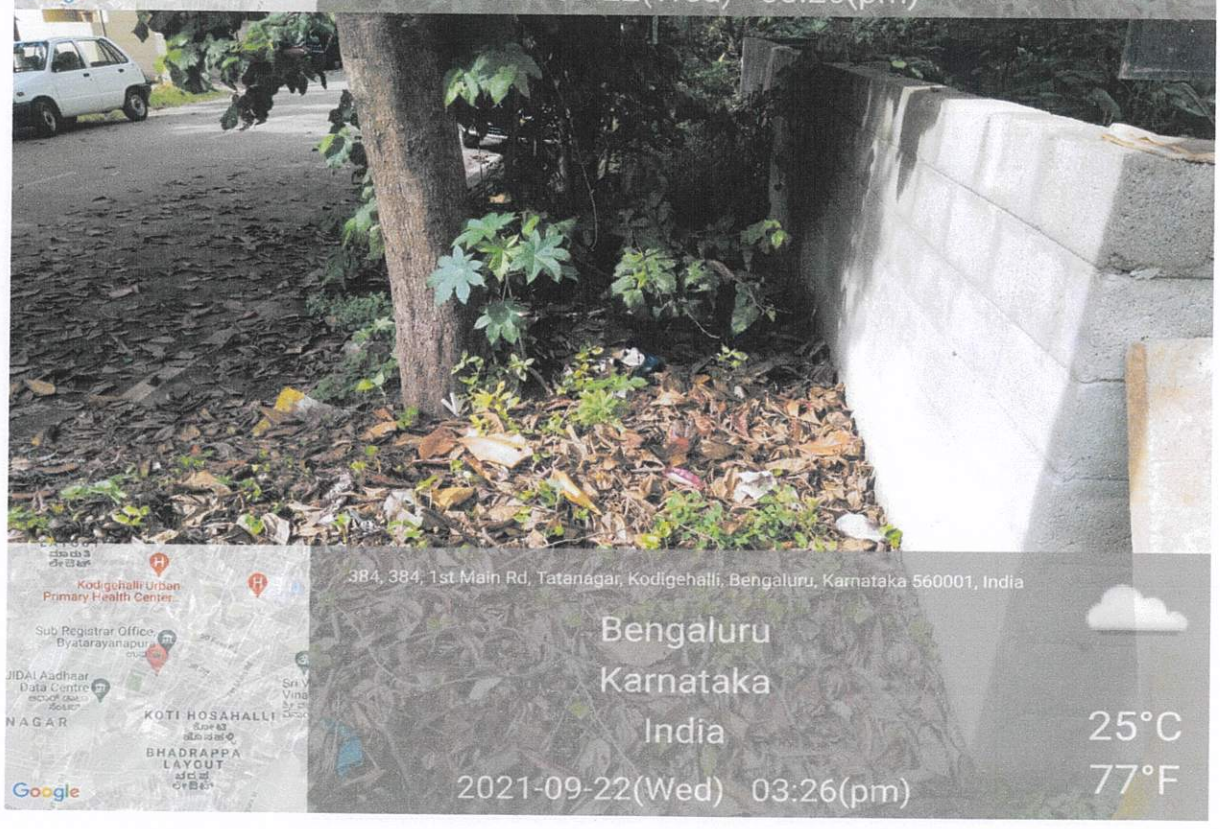

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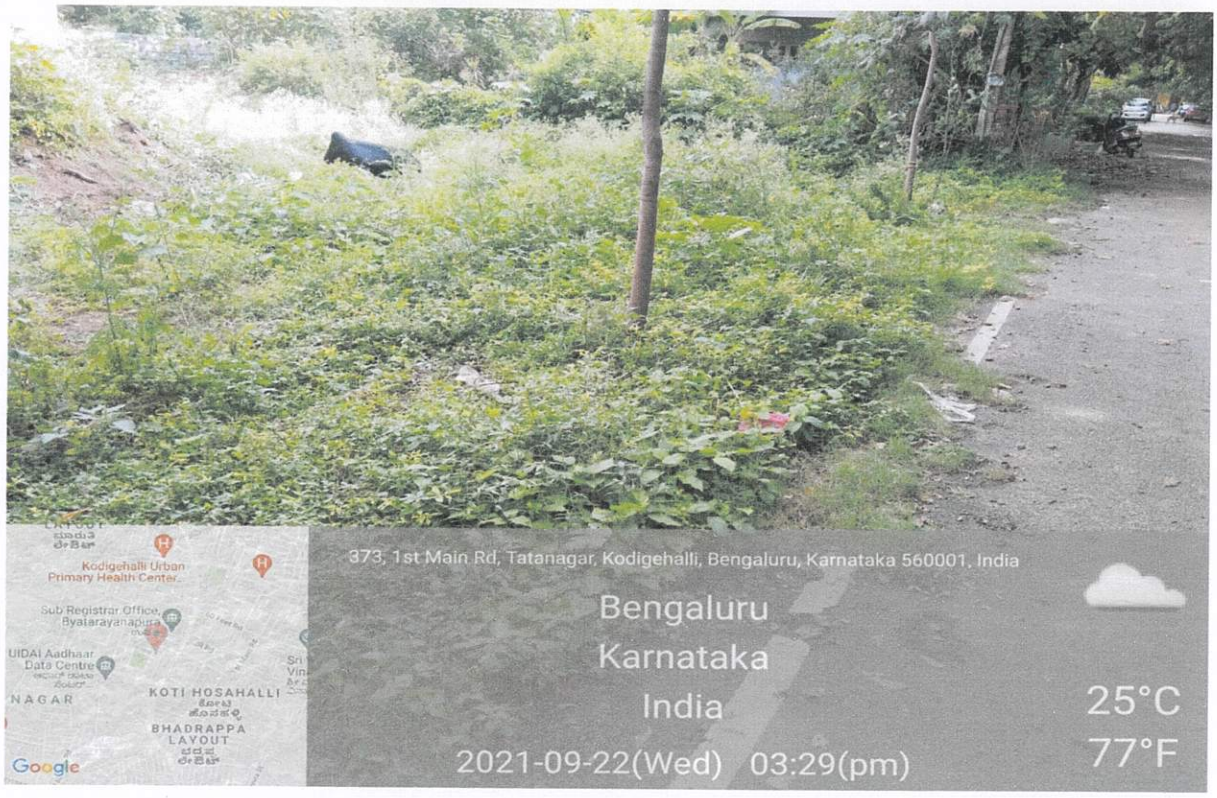

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SHRIYA CONSTRUCTION AND CONSULTANCY

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SHRAVA CONSTRUCTION AND CONSULTANCY

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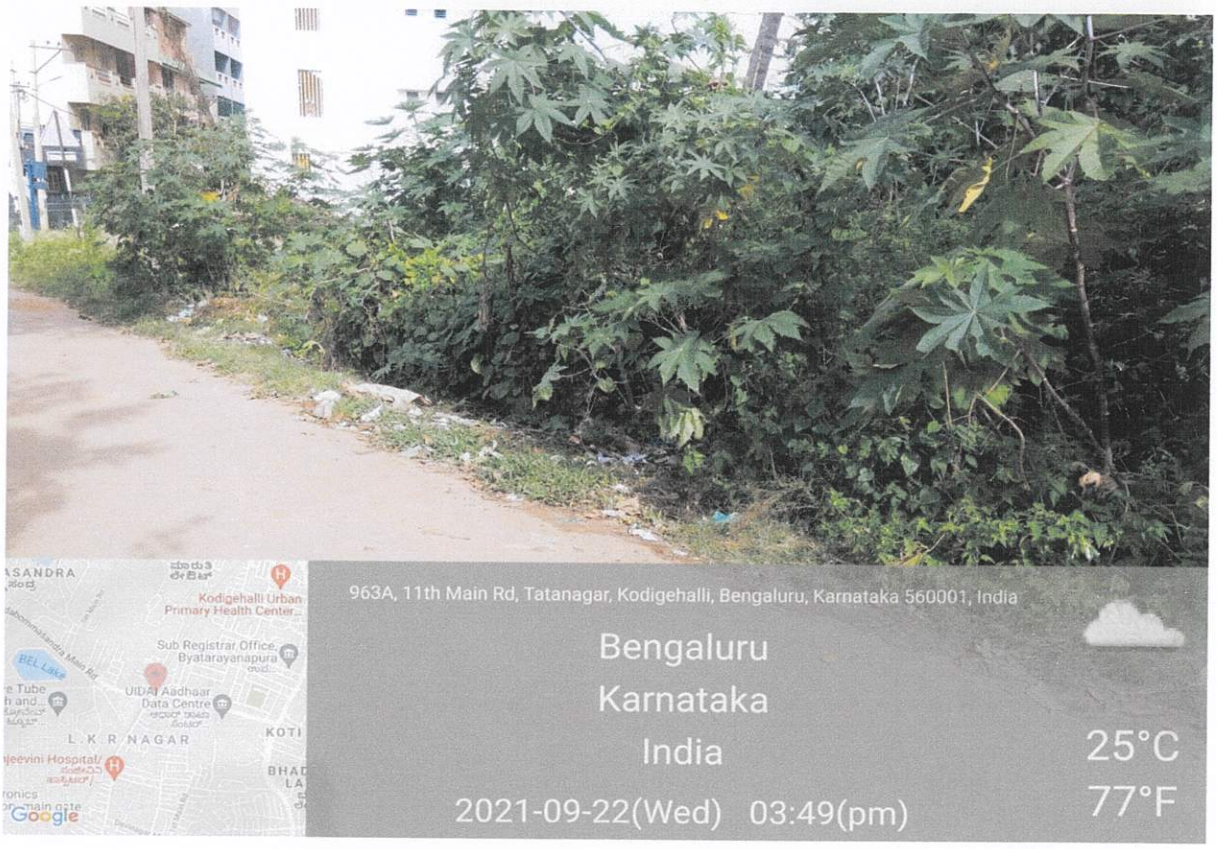

Assistant Executive Engineer
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SHRIYA CONSTRUCTION AND CONSULTANCY

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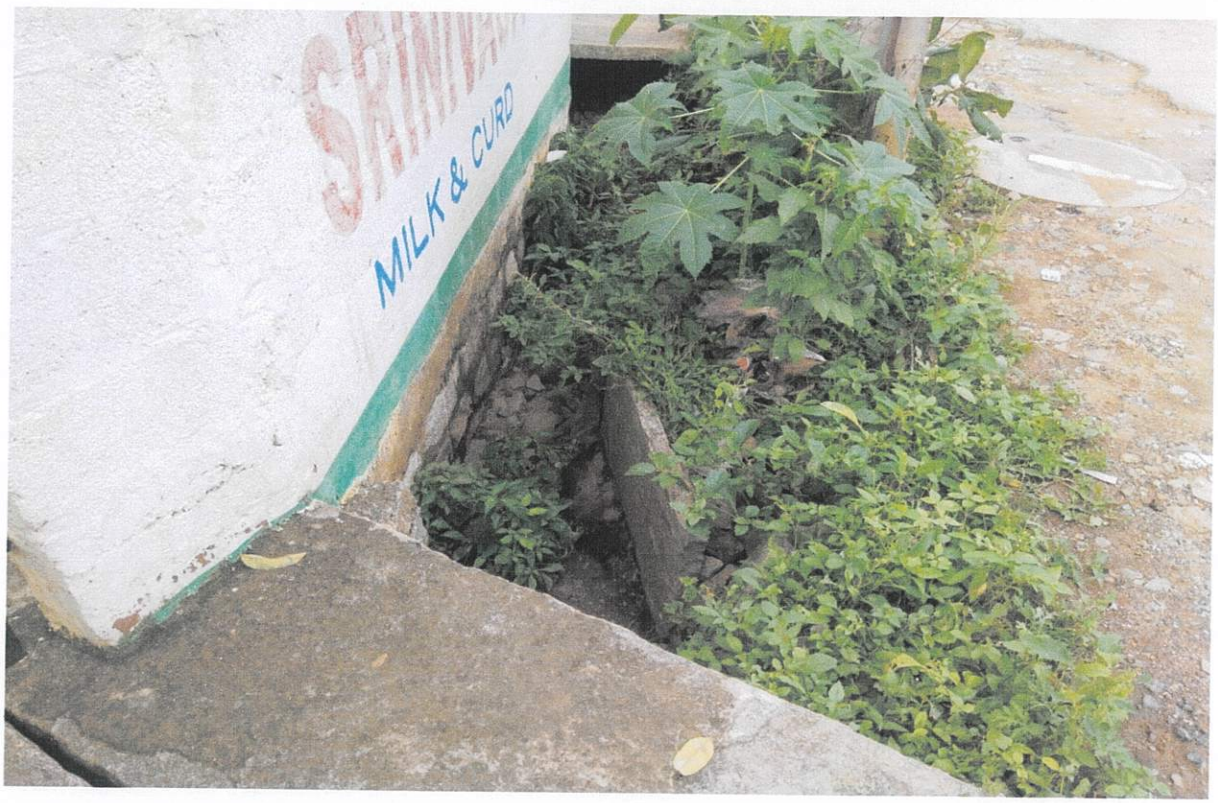

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SHRIYA CONSTRUCTION AND CONSULTANCY

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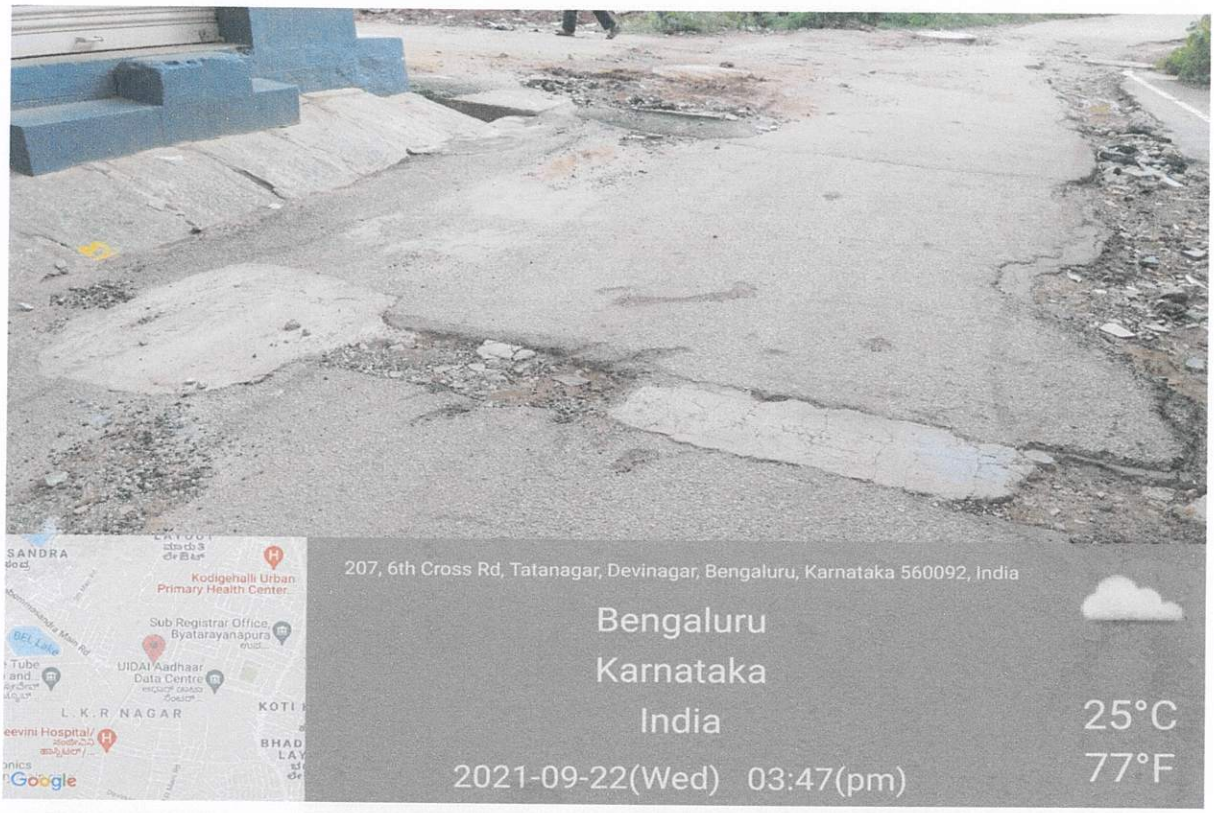

Assistant Executive Engineer
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SHRIYA CONSTRUCTION AND CONSULTANCY

NAME OF WORK : Improvements to Roads and drains in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli

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SHIVA CONSTRUCTION AND CONSULTANCY

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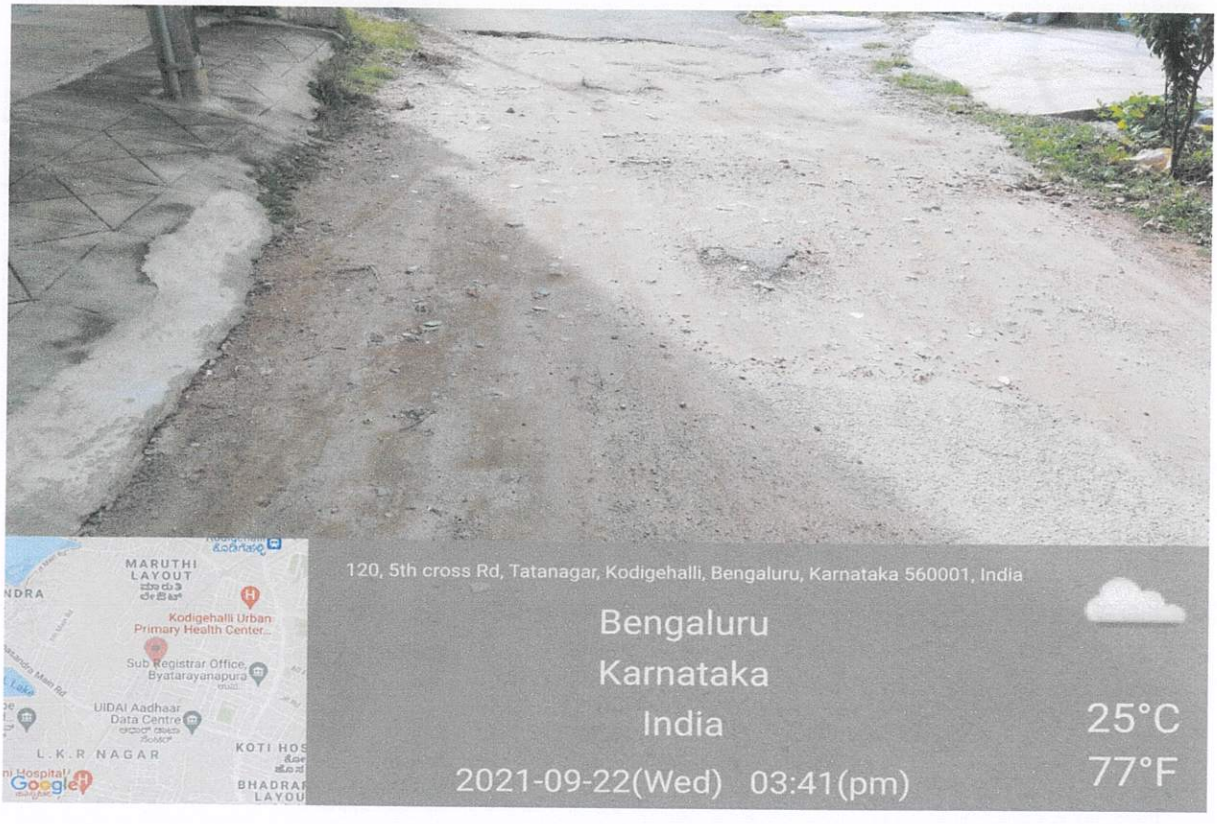

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SHRIYA CONSTRUCTION AND CONSULTANCY

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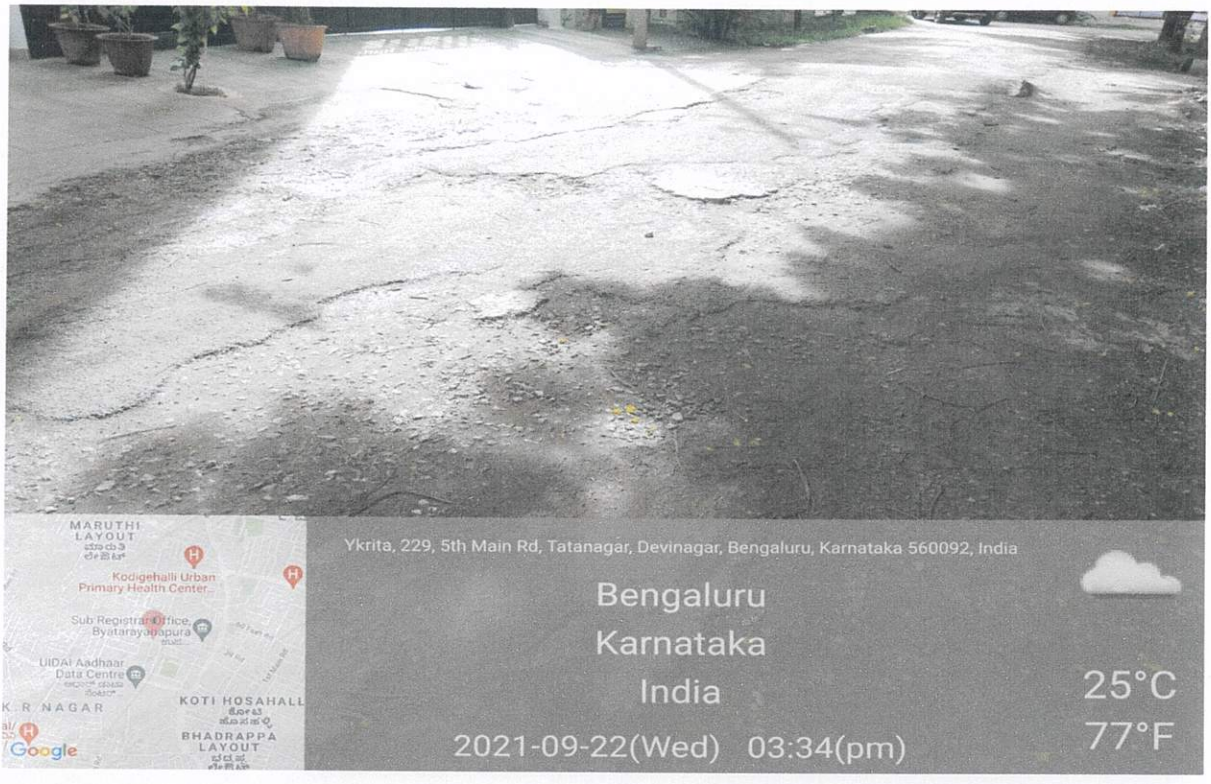
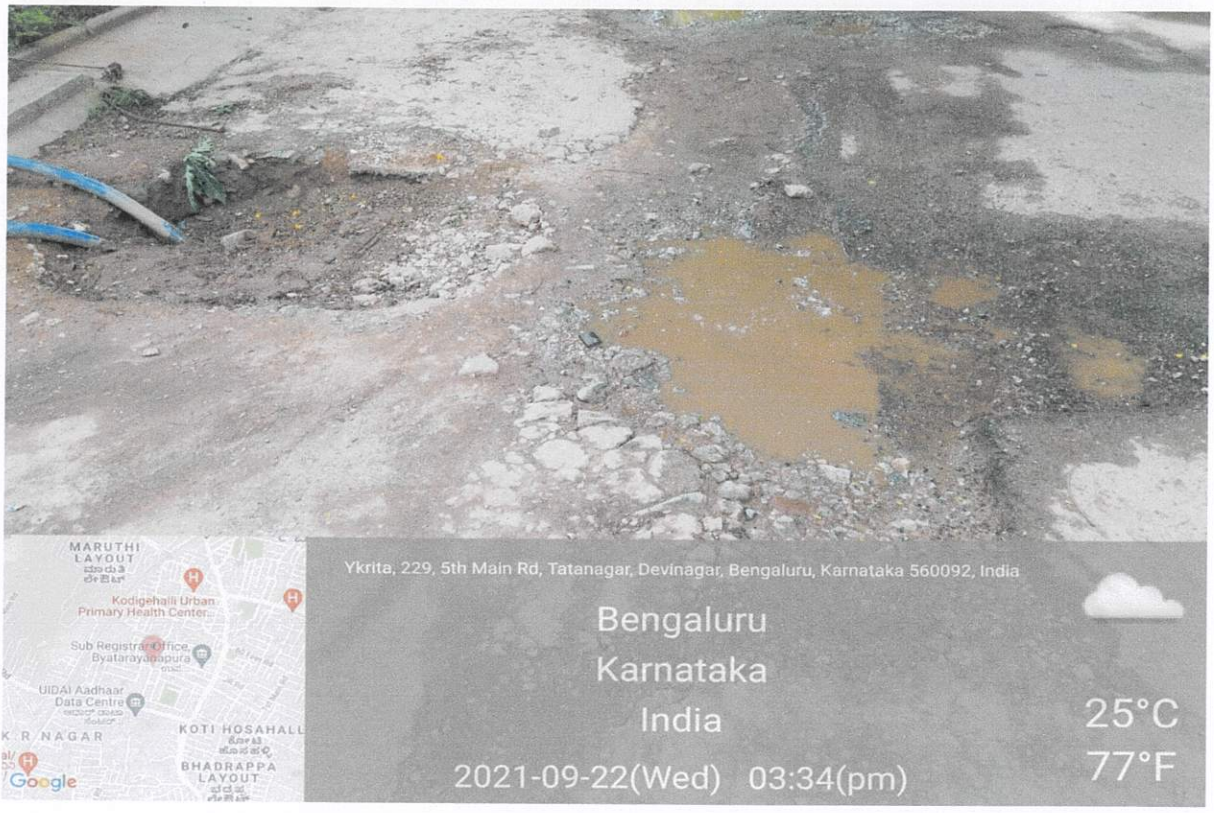
SHRIYA CONSTRUCTION AND CONSULTANCY

NAME OF WORK : Improvements to Roads and drains in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli





Assistant Executive Engineer
Kodigehalli Sub Division
BBMP, Bangalore

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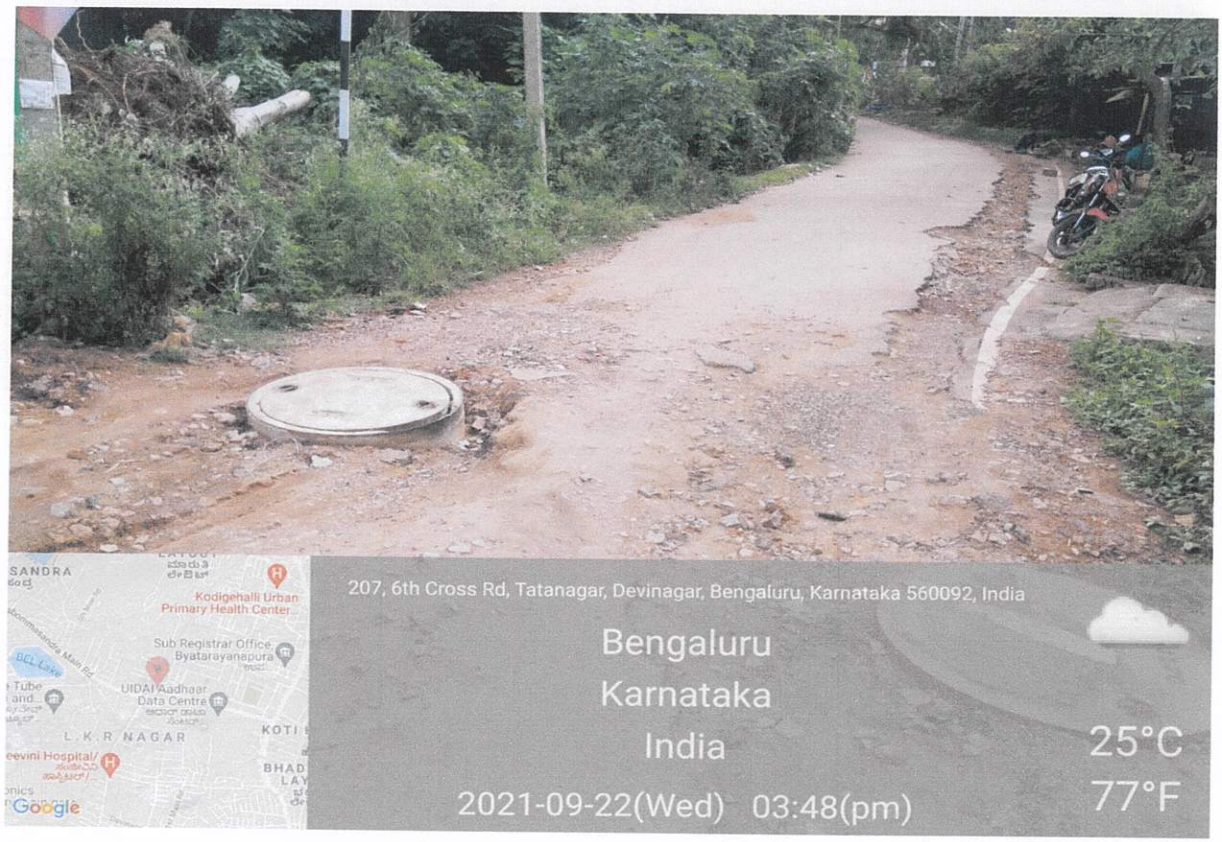
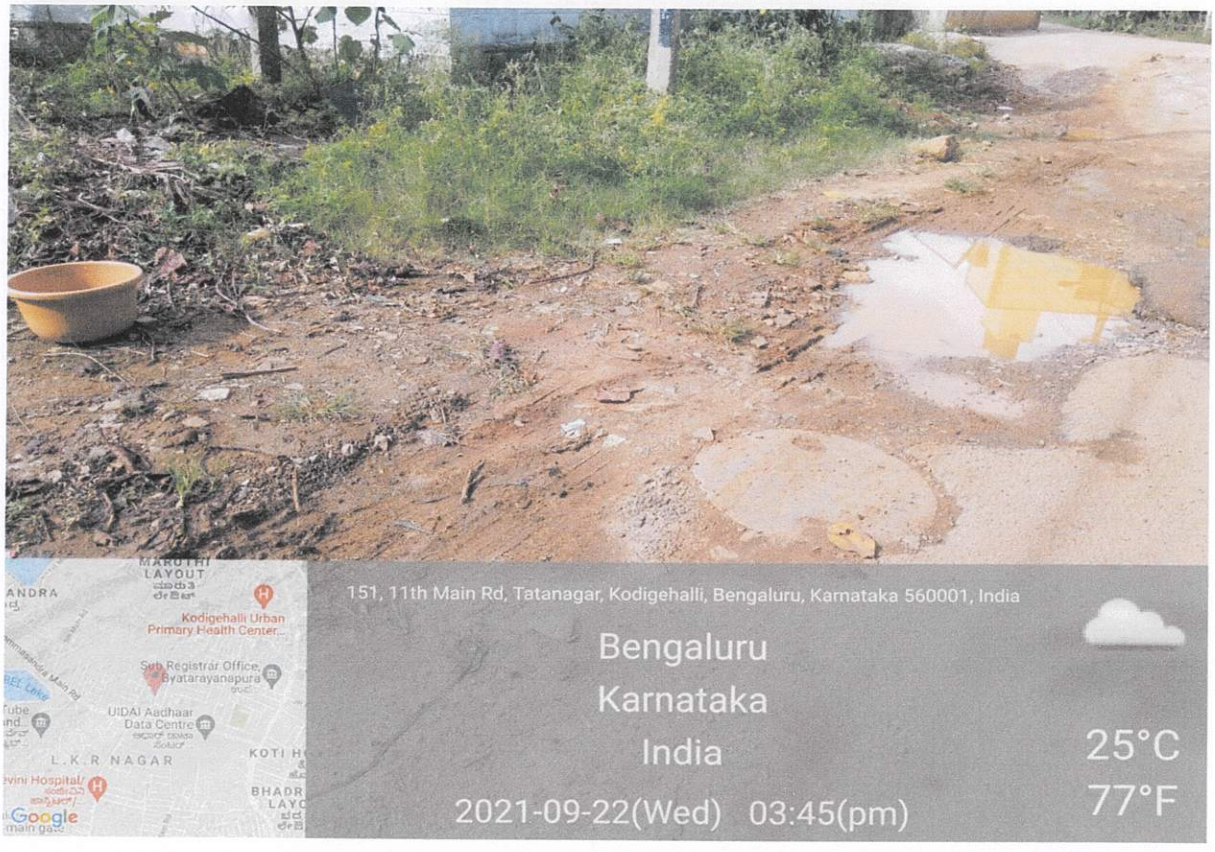


Assistant Executive Engineer
Kodigehalli Sub Division
BBMP, Bangalore

SHRIJIVA CONSTRUCTION AND CONSULTANCY

NAME OF WORK : Improvements to Roads and drains in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli



Assistant Executive Engineer
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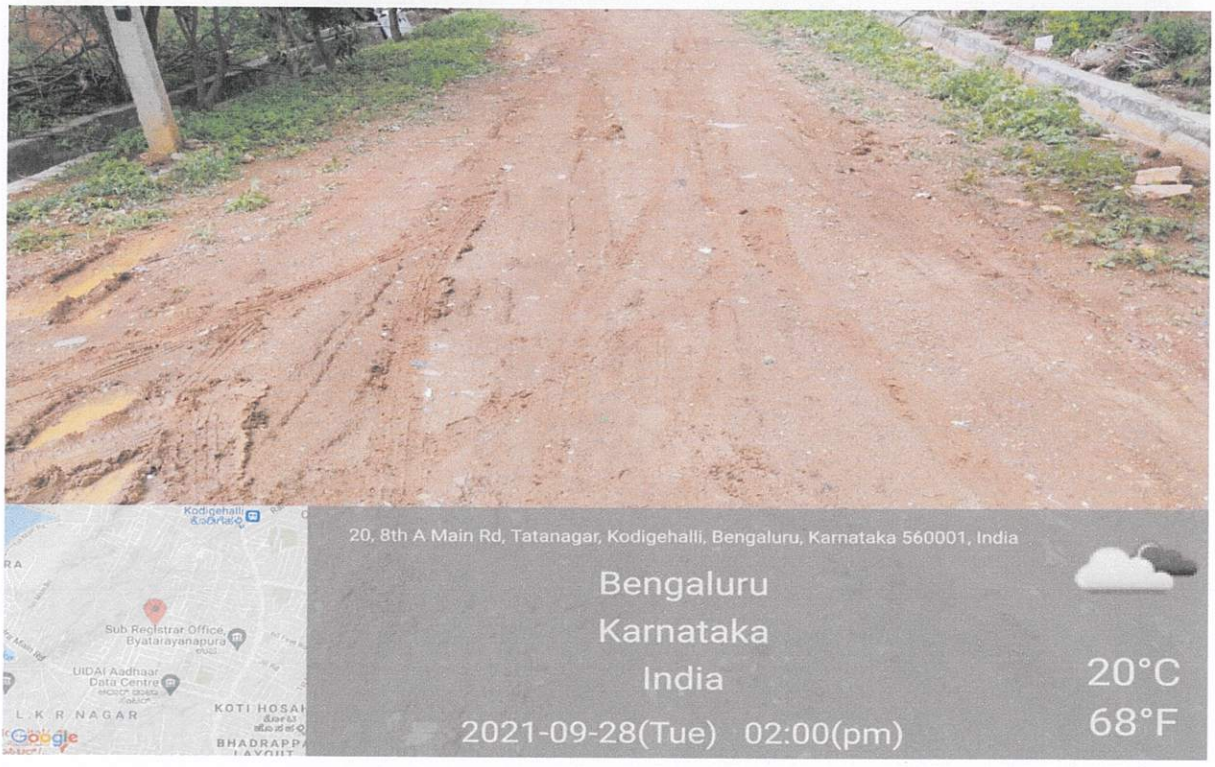
BBMP, Bangalore

SHRIYA CONSTRUCTION AND CONSULTANCY

NAME OF WORK : Improvements to Roads and drains in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli



Assistant Executive Engineer
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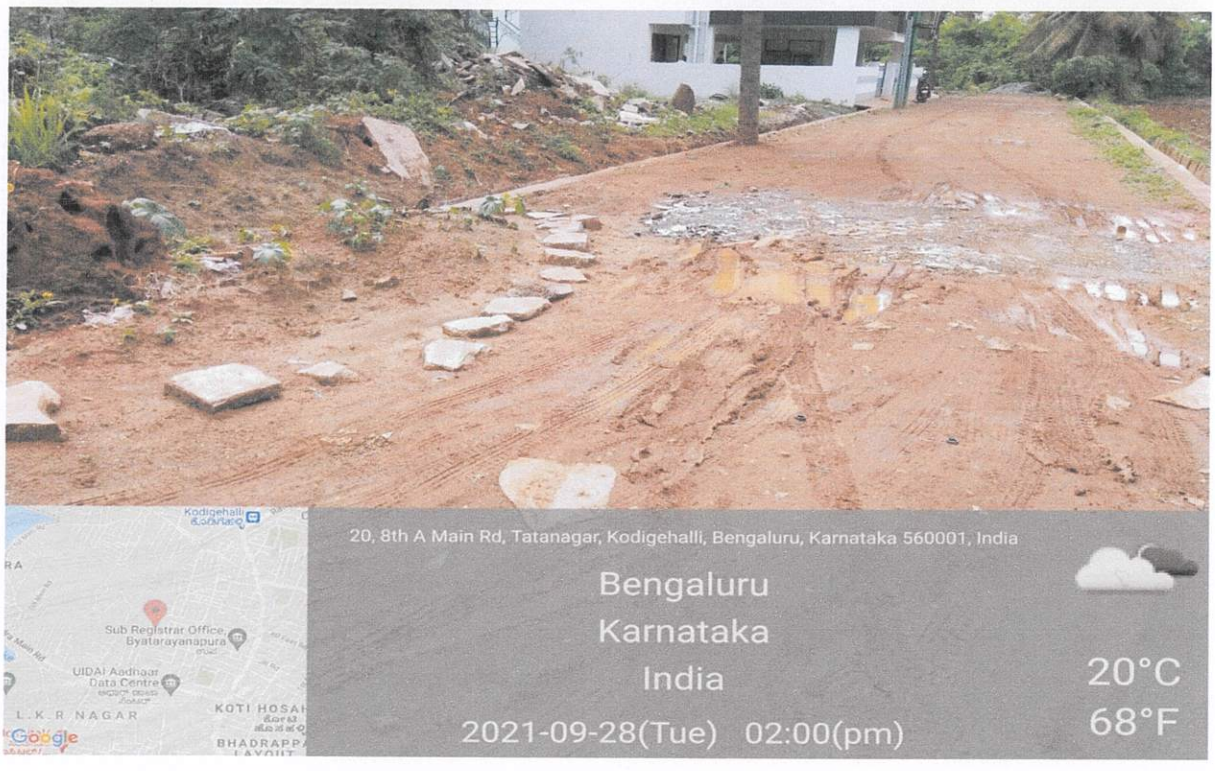
BBMP, Bangalore

SHIVA CONSTRUCTION AND CONSULTANCY

NAME OF WORK : Improvements to Roads and drains in Tatanagara, Devinagara and surrounding areas in ward no -08, Kodigehalli



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